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FEET FROM GROUND. NORTH SPRINGFIELD, OHIO.
OCCUPIED 1885-1900.

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NESTS AND NESTING HABITS OF THE AMERICAN EAGLE.¹

BY FRANCIS H. HERRICK.

Plates XIII-XV

IN northern Ohio the fringe of forest along the southern shore of Lake Erie has long been the haunt of the American or White-headed Eagle (*Haliaeetus leucocephalus*). They were here before the white man dispossessed the Indian, and here many have remained, in spite of all the changes which he has wrought in the forests and upon the shore, undismayed if not undisturbed by his incessant activities afield; until, unless an active war has been waged against them, they have come to show no fear of the once novel sights and sounds of an advancing civilization, and for the most part they have come to disregard them utterly, ever trusting to their inherent powers of circumspection for their own safety, to their physical prowess, their adaptability and to their marvelous speed in the air.

The lake country was no doubt favored by the Eagles because of the almost never failing supply of fish to be found in most seasons either at the surface or stranded upon the beach, a supply now greatly augmented at certain points by rejects from the pound and gill-nets of fishermen.

The favorite nesting trees of this region are the sycamore and the shell-bark hickory; and that the dying or dead of these and

other species are repeatedly chosen by the same pair of birds must no doubt be ascribed to habit, determined in the first instance by the need of a safe approach to the eyrie, and of an unobstructed outlook from its spacious summit. When one of the branches which supports the nest comes to be used as a perch, the nesting scenes take on at once a new and livelier interest; for then the birds can shift readily from nest to perch, or back again to the nest, and to have the whole family at dinner may be a daily experience. It is possible that a sound tree, when long occupied, might suffer and finally languish under the ever growing mass of vegetable decay which it is usually called upon to sustain. This was apparently the case with the nest-tree at Vermilion, Ohio, about which our interest will be mainly centered in subsequent articles; though somewhat broken at the top, there was enough foliage about this great nest in 1922 to seriously hamper observations; in the following spring, to our great surprise, the flow of sap suddenly failed and, except upon a single branch at a height of barely twenty feet, the life of this tree went out. Other hickory trees in the same grove, though unencumbered, have also died, and during the spring gales of the present year many were broken or overthrown, so we can record only the fact, while the relation of cause and effect remains in doubt.

So far as I have observed, the nest-tree is seldom at first completely isolated, but commonly stands on the border of woods or in an open grove, a mile or more from the lake, and it often rises to such a height as to command the entire neighborhood. I have known one instance where the surrounding timber was cut away, but a kindly farmer spared the Eagles' tree, and its great eyrie, borne aloft and visible for miles in certain directions, stood out like a castle on a hill.

What has just been said would not apply to island-nests, and in our studies of the Eagle experience, is ever warning us against indulgence in the easy path of generalization; not only must we

¹ The "Bald" or White-headed Eagle was adopted as the sign of the independence and sovereignty of the United States by vote of the National Congress on June 20, 1782. Although the Golden Eagle (*Aquila chrysaetos*) is also found within our limits, being now confined mainly to the territory west of the Mississippi River, it seems appropriate and would certainly be convenient to designate our national bird as "The American Eagle," and to make the popular use of this term exactly discriminative of the species.

expect to find much variation in habit among different individuals, but also in the same individuals at different times, for habit in this sense is the result of experience. Most Eagles are great place-holders, and we have recorded the instance at Vermilion in which the same eyrie has been occupied for upwards of thirty-four years without a break, and the immediate region for nearly a century; while other individuals, bent possibly upon improving their condition with respect to the food-supply, their safety or that of their eyrie, seem to be constantly on the move. Thus, a pair at Danbury, Ohio, have moved three times in five years, and I have known a deserted eyrie to be reclaimed after an interval of one or more years, presumably by the original owners. At Kelley's Island a number of nests are in open pastures, and in at least one instance the site is so poorly chosen as to suggest the work of inexperienced builders. On an island in the Pacific, fifty miles south of San Pedro, known as San Clemente, in February, 1903, Breninger¹ found two ground-nests of this Eagle in February, 1903; they were placed on either side of a deep gorge, and were said to have been used in alternation by the same birds for the space of fifteen years; the one, on a large rock a mile from the north end of the island, then contained two eggs; while the other, on a hillside amid grass, was then in disuse; the latter was so high that a man standing beside it could not see into its shallow top.

When the site is well chosen, the nest is securely held in the grasp of a number of spreading branches. Possibly any tree offering such conditions might be taken, but I have seen only the sycamore, the hickory and the elm thus used, and the fact that a given pair of Eagles will sometimes favor the same kind of tree for a number of successive nests is a strong argument for the force of habit. Where the upright branches are nearly vertical, the nest, as in that formerly at North Springfield, Ohio, gradually assumes a cylindrical form (Plate XIII); where the spread is greater, the eyrie takes the cup-form and later that of the wine-glass or tall inverted cone (Plate XIV); in an exceptional case at Kelley's Island, to be later noticed, the eyrie was remarkably symmetrical and in shape of a huge bowl over twelve feet in diameter (Plate XV);

¹ Breninger, Geo. F. San Clemente Island and its Birds. *The Auk*, vol. xxi, p. 219. Cambridge, 1904.

but it should be noted that such comparisons apply to the exterior only, since "cup" and "bowl" are here solid to nearly the brim; indeed in certain cases no concavity exists, but the eyrie is markedly convex at the top. The diameter of a new as of an old nest will depend, as I have intimated, upon the angle of divergence of its main supports, but in a number of instances observed the first year's nest measured five feet across the top and its height was approximately the same.

A nest of the first year consists of a great mass of sticks, gathered mainly from the ground, borne to the nest-site in one or both talons, by either bird, and laid individually with aid of the bill; as this mass of faggots grows, greater attention is paid to the periphery, where the coarser materials are more carefully and more effectively interlaid and adjusted; the center and interstices are filled with dead weeds, cornstalks and stubble, with incidentally considerable earth introduced with pieces of sod and with weeds. It is no wonder that with the growth of years the core of such a structure comes to form a sodden mass of vegetable mold. The largest sticks which I have taken from different nests were a yard long and two inches thick, but many which I saw in a nest at Kelley's Island this summer appeared to have a length of over six feet. I am not yet ready to speak of the act of nest-building in detail but examination clearly indicates that such sticks are mainly gathered from the ground. The owner of the land on which the nest at North Springfield was situated told me of having seen his Eagles in nesting time fly against the dead branch of a tree and, as it snapped with a sharp report, bear it off to the eyrie; if such statements are true, the Eagle clasps the branch in its talons and breaks it off by sheer force as the Fish-hawk is known to do, an easy matter for birds of their weight and strength. The Vermilion Eagles at a later phase of nest-life would now and again bring in their talons a cluster of living oak-twigs and lay them upon the nest, a curious habit, the meaning of which will be considered in another place.

Eagles are supposed to be mated for life and when one is bereft it goes in search of a new mate. So far as known its quest is invariably successful though it may return with a bird in juvenal dress. This loss and substitution of a mate occurred at the Ver-

million nest when one of the pair was shot, but this was some years ago and the exact circumstances could not be determined. It may be doubted if either parent would desert or leave for long their young when well started on the road of development; on the other hand, we might expect a lone bird to abandon its eggs per force and, if again mated, to begin a new nesting cycle upon its return; but whether this has actually happened or not cannot be stated. Since at least three years are passed before acquiring the perfect coloring,—white head, neck and tail, and yellow bill,—and since young birds without doubt become sexually mature the first spring after birth, one may expect to occasionally find one in brown or juvenal dress mated to a full colored bird; and Hoxie¹ mentions a case in Chatham County, Georgia, in which both birds were in immature plumage, though the female was then beginning to show distinct traces of white in the tail; the nest in this instance was in process of building on March 6, 1909, but according to this observer it did not contain young until May 17. The incubation period was given as 83 days, and the time from hatching to flight as 42 days. Fresh eggs were said to be found in that section from mid-November to late March. Two cases were also mentioned, at Savannah, in which this Eagle laid a second set of eggs after having been robbed of her first; in the one instance the first set was taken on December 5, and in the other on the twelfth of the same month. There is a similar record for Lincoln County, Maine,² where the Eagles held to their eyrie after being repeatedly robbed, and in all probability they made their losses good. In this instance the nest was in a tall dead pine, and what is more important it was lined with green pine boughs, the possible significance of which will be noticed at a later time. Two partially incubated eggs were taken from this nest on April 7, 1891, and three, in which the development was far advanced, on the sixteenth of the same month of the succeeding year. The following happened at the Vermilion nest; a collector ascended the tree and removed the first set of two slightly incubated eggs on March 18, 1920, after which a second set was laid and the young reared in due

¹ Hoxie, W. J. Notes on the Bald Eagle in Georgia. *The Auk*, vol. xxvii, p. 454. Cambridge, 1910.

² See *The Auk*, vol. xxiii, p. 222. Cambridge, 1906.

course. I have not yet definitely determined the exact period of incubation at Vermilion, being unwilling to interfere in any way with the process until our observations on all later phases of nest-life were reasonably complete. From what was seen this year, however, I am satisfied that the incubation did not exceed four weeks.

It is commonly said that Eagles, when once settled down, occupy the "same nest" year after year; it would be more exact to say that the Eagle builds anew each year, but uses the old nest as a site for the new one. Like most other birds it satisfies its building instinct at a certain time every year, but unlike most it is chained to a certain spot, which is its old nest. As a result of these yearly increments the Eagle's eyrie gradually rises in height and, since it must meet the spread of its main supports, it may increase steadily in diameter often, as we have seen, taking the form of an inverted cone or balloon, until at last the nest-tree collapses under its ever increasing burden. Such a structure from the standpoint of the student, if not of the builder, is thus a compound or storied nest; it might be compared to a stack of saucers, each of which represents a "nest," or a unit which is yearly added to the pile, but becomes so completely incorporated with what precedes as to be thereafter inseparable from it.

II.

Of some eight nests of the American Eagle which I have examined in the south shore region of Lake Erie, two were at North Springfield, two at Danbury and three at Kelley's Island, besides that at Vermilion, the most remarkable of them all.

While travelling on the Lake Shore railroad some years ago, I happened to notice an Eagle's nest from the car-window not a thousand feet from the line at a point near Girard, in Pennsylvania; as this nest appeared to be of unusual size and occupied the top of a dead truncated tree which stood quite alone, it aroused my curiosity. After learning that this great eyrie had long been a landmark of that region, being well known apparently to every workman upon the road, I resolved to pay it a visit. Upon reaching Girard in the following June, I found to my keen regret that the old sycamore with its famous nest had gone down in a gale

of the previous winter, but from photographs¹ made before its fall (Plate XIII), together with measurements which it was then possible to secure upon the ground, I am able to give its exact dimensions. It was nine feet in height and had a nearly uniform diameter of six feet; according to report it had been occupied for fifteen years and its top, as I found, had originally stood at a height of seventy-seven feet from the ground. The nest was essentially wedged between two upright branches, though receiving some support from a smaller division of the main stem which at the base attained a diameter of three and one-half feet; its two main supports were broken off at a height of six feet from the top of the eyrie and served the Eagles as favorite perches and lookout points; the nest was a great mass of wattled or inter-crossed sticks, made solid with earth and the resultant decay of the annual additions of weeds, stubble and straw.

For many years these Eagles were said to have occupied a dead sycamore in the midst of woods in Milesgrove, Pennsylvania; when this aged tree succumbed, the more famous nest, which we have described, was established in another sycamore, also dead, at North Springfield just over the line, in Ohio, in 1885; this lasted as we have seen fifteen years, or until January, 1900. The third nest was started in the spring of that year at a point not many rods from the site of the second and again in a sycamore, but this time in a living and sound one. This tree had a girth of twelve feet at the ground and a clean straight bole without a branch, for sixty feet; at this point it spread a number of strong arms which formed an all-embracing niche for a nest of great size. No doubt it was this great crotch which had attracted the Eagles, though close beside it rose a stately tulip tree, the branches of which met those of the sycamore and partly overshadowed them.

Upon approaching this nest on the eighth day of June not a sound was heard for full twenty minutes, when suddenly one of the Eagles appeared, whose behavior suggested the male bird and, circling overhead, began to sound his peculiar alarm, which I have heard many times since. It may be transliterated as *kar! kar! kar!*

¹ By Mr. H. E. Denio, of Milesgrove, Pennsylvania; for a series of pictures of this nest, see "The Eagle's Nest," *St. Nicholas Magazine*, vol. **xxix**, New York, 1902.

with sometimes the suggestion of a final *k* at the end of each syllable, or again as *cac-cac-cac!* Then, alighting in the topmost branch of a dead tree, he expressed his emotion in a manner characteristic of many birds even as remote of kin as the Nighthawk; with depressed head and neck outstretched, with drooped and quivering wings, his mandibles would open and close with the regularity of clockwork. Dr. William L. Ralph¹ was always able to recognize the male by this alarm, the call of the female being more harsh and often broken. The female was sitting in her eyrie during the time of our approach, as became evident when she suddenly left it and with protesting screams soared over the tree-tops; neither bird would come to the nest while I was in the neighborhood. At this time there were two Eaglets in full feather but quite invisible from below, except as one would appear and shoot a white stream well over the edge of the nest. At the Vermilion nest we did not hear the alarm-call after the last week of May in 1922; not once was it sounded within hearing during our long vigil beginning early in June and lasting until the flight of the young Eagles in early July. Silence also seemed to be the rule during the present season, and it was possible for us to determine the female only by her slightly greater size and more sinister countenance. We noticed, however, that whenever an observer showed himself upon our platform, passed under one of the perches or approached the observatory tree, either Eagle, if present, would crane its neck in his direction, open and close the mandibles and if uttering any sound at all, biting it off so effectually that it was scarcely audible at a distance of eighty feet.

Two nests which I examined at Danbury, on July 5, 1922, and which were occupied successively by the same pair of birds, were markedly convex at the top, but whether this peculiarity was due to a habit or whim of the builders or, as seemed more likely, to a lack of suitable supports at the margin of the nests, could not be determined. I am able to give a partial history of these nests through the efforts of Mr. W. G. Tibbels to save the Eaglets from community vengeance. The farmers in their vicinity, it seems, had lost a number of their chickens and were bent on keeping the

¹ Bendire, Capt. Charles. *Life Histories of North American Birds.* Smithsonian Contributions, vol. xxviii. Washington, 1892.



NEST OF BALD EAGLE, WINE GLASS FORM, 81 FEET FROM GROUND AT VERMILION,
OHIO, APRIL 21, 1923. PHOTOGRAPHED FROM PLATFORM
AT HEIGHT OF 85 FEET.



Eagle-population down. The first nest to be built and occupied stood at a height of about seventy feet in the top of a dead shell-bark hickory on the edge of woods, about midway between Sandusky Bay and the Lake; it was rather more than six feet tall and measured four and three-quarters feet across the top. Mr. Tibbels climbed to this nest at about the middle of June for three years in succession, 1919-21, and removed the young, his plan being to hold them until they were able to fly and then release them. The old Eagles, he told me, behaved in essentially the same way each time he raided their eyrie; they would swoop down at him with talons extended as if about to strike, but they always swerved when six feet or more away and would eventually settle in the top of neighboring trees, where with opening and closing mandibles they gave vent to their alarms. They did not leave the vicinity while he was at the nest. On one of these visits the eyrie was strewn with the carcasses of muskrats, rabbits, chickens and fish, including the half-decomposed body of a large carp; two of the muskrat-skeletons carried each a steel-trap, which might indicate that these rodents had been taken outside of the nesting season, or at least not long after the beginning of March, and that the eyrie served its owners as an habitual dining-table.

In the spring of 1921, according to Mr. Tibbels, the Danbury Eagles were seen carrying nest-materials to a new site a mile away while they continued to hold to their first nest described above; this was finally abandoned at the close of that season, probably not because of the repeated raids which had been made upon it, but rather on account of the insecurity of the nest itself, which had lost a main supporting branch. At the time of our visit it was sagging over the stump of this lost limb and appeared as if ready to topple over in the next storm. At all events the new nest was completed and occupied in the spring of 1922 upon the site which had been determined the previous year. This second nest was also in a dead hickory that stood on the border of woods and, although barely elevated above the surrounding tree-tops, it afforded a good outlook. The tree was less than two feet in its greatest diameter and the nest, which was estimated to stand at a height of about seventy-five feet from the ground, was approximately five feet tall and would measure as much or slightly less

across the top. When Mr. Tibbels climbed to another nest about the first of May, he found the top strongly convex, as in the former case, and three eggs lying close together in a depression that was evidently made by the laying bird. On this occasion the old Eagles, contrary to what might have been expected, made no hostile demonstrations, but kept the climber in sight while they were perched in neighboring trees.

As we approached this second nest on the fifth of July, about seven weeks later, one of the old Eagles stood guard above it and soon went off in silence, but a young bird (Plate XIII) that was resting or possibly feeding in the eyrie itself remained until we were close upon the tree. We found that the two Eaglets, which had been on the wing for upwards of a week, were still in the habit of returning to the eyrie either alone or in the company of their parents.

The unpopularity of these particular Eagles evidently had not abated, for an attempt had been made to fire their nest-tree; whether they were eventually driven out or not, I do not know, but according to Mr. Tibbels they again abandoned their eyrie in the spring of the present year, and moving across the peninsula, settled eight miles to the northwest at Port Clinton.

On July 2, my assistant, Mr. E. J. Humel and I visited Kelley's Island, which lies ten miles due north from Sandusky, and is only less famous for its Eagles than for its extensive limestone quarries and its world-renowned glacial grooves. The Eagles now frequent the semi-wild eastern half of the island, which is three miles long by two broad. We visited three nests in the short time at our disposal and learned of a fourth; very likely others still exist and would have rewarded a longer search. All of the nests which we examined were said to have been recently occupied, but they were abandoned at the time of our visit and not an Eagle was seen on the island. Our arrival happened to coincide with that of the well known annual pest of mayflies or "Canada soldiers," which come suddenly, remain a week or less, and as suddenly depart. It is no exaggeration to say that, after leaving the roads, we were hampered at every step by these extraordinary creatures which covered all exposed objects; all standing room seemed to be taken on every spear of grass, on every twig and leaf; the very

bark of the trees, great and small, being "furred" by them; and as we walked they swarmed up in such incredible numbers over our bodies as to almost blind us. It was difficult to keep the lens of our camera clear of them long enough to take a photograph.

All the nests which we saw were in open pastures; the first to be visited, on the northeast side of the island, stood in the top of a decrepit elm at a height of about 75 feet; it was of the cup-form, perhaps eight feet tall and six feet or more across the top. A farmer, engaged in spraying his grapes near by, informed us that it had been abandoned and again reoccupied the present season. Another nest, farther to the south and east, was also in a living elm, which was twelve feet in girth and stood some twelve hundred feet from a roadway. It appeared to be very insecurely placed at a height of about sixty feet and was evidently a nest of the first year, measuring hardly more than five feet either way and remarkable only for its asymmetry, and the great length of many of the sticks which entered into its mass.

The second nest that we visited, at a point a little to the south of the first, was so remarkable that the sight of it alone amply rewarded us for all our trouble and annoyance with insects. It crowns a remarkably small shell-bark hickory (Plate XV), hardly more than a foot in diameter at its base and living in every branch, the lowermost being within reach from the ground so that a good climber should be able to make the ascent in five minutes, and by the aid of a cord to surmount the eyrie. We were told that not long ago a man had made this attempt, but was attacked so viciously that he quickly had a change of heart. This nest is remarkable for its symmetrical bowl-shape, as well as for its great size; according to our rough estimates, it is eight feet tall and twelve feet across the top, which is not over forty-five feet from the ground. It is very evident that the unusual form of this nest is due to the spread of its main supports, which diverge at an angle of seventy degrees. It should be noticed that the top of the eyrie in this instance is almost completely shaded by branches rising to a height of ten feet or more on all sides.

The history of the Vermilion Eagles, the fullest of which I have any records, and covering a period of over eighty years, is given in detail in an earlier paper.¹ During that time four nests have been

¹ The Auk, Vol. XL. 1923.

occupied for varying periods in the township of Vermilion, at points a mile or more removed from the shore of the Lake. The fourth and present nest (Plate XIV), which has been occupied for at least thirty-four years, stands at a height of 81 feet, in a shell-bark hickory which, as already noticed, was more or less alive up to the spring of 1923; it was 12 feet tall and $8\frac{1}{2}$ feet across the top when exact measurements were made on July 20, 1922. When examined at this time, just sixteen days after the young Eagles were on wing, all carcasses of fish, chickens and other animals had been removed and its inside depth did not exceed four or five inches; the Eaglets, in the course of many weeks of exercise, had trodden its surface nearly flat. At that time all the surface material, to the amount of half a bushel or more, was gathered up and lowered in a sack; this was found to consist of fish and chicken bones in sparing amount, fish-scales, short loose sticks such as the young Eagles had often been seen to use in their play, fragments of corn-stalks, clusters of oak-twigs with the dried green leaves still upon them, corresponding with what we had seen the old Eagles bring to their eyrie, besides a miscellaneous assortment of vegetable rubbish. Underlying this loose layer was a fairly compact floor of vegetable mold, which extended some two or three feet on all sides from the center of the nest and was easily dislodged with the hand.

III.

Though hoping to turn my attention to nest-building and other early phases of activity another year, I will now set down in brief what happened at the Vermilion nest in the spring of 1923. When Mr. Headline and his men were building the second platform of our observatory on March 13-15, they were obliged to abandon their work for a part of the time on account of severe gales, which during that month brought down many trees in the grove and threatened that of the Eagles with destruction; accordingly we took the precaution of securing it as best we could by the aid of steel wires. The Eagles were engaged in building also; but, as Mr. Headline reported, they paid little attention to the carpenters; while one of the Eagles would fly over the eyrie and drop a bundle of straw, cornstalks or stubble, which it carried in its talons, the

other would dispose of it, remaining thus engaged for fifteen or twenty minutes at a time; they had already built a barrier of sticks about the margin, and were now laying a mattress of straw and softer materials over the center; when the carpenters finally returned to finish their work on the twentieth of March, this bedding was completed, and one of the Eagles, presumably the female, was sitting in its midst, though not continuously while the men were there. We infer that at least two eggs had then been laid, or were about to be laid, and allowing the Eagle two or three days for sitting on the nest before actually producing an egg, the probable error as to the beginning of incubation is not likely to be greater than this either way.

When I next visited the nest with Mr. Headline on April 6, incubation was well advanced; as we proceeded down the lane and entered the grove not an Eagle was to be seen, and in spite of our past experience it was impossible to repress the feeling that some mishap might have befallen eggs or birds. We had not taken many steps in the grove, however, before the male suddenly hove into view from the east, wheeled and settled on one of his habitual perches in the woods. This quickly dissipated our fears, and as we approached the nest-tree a white head rose from the top of the eyrie, at its very center; with the binoculars we could see that head and neck were craned in our direction, the better to follow our movements upon the ground; as we reached the observatory-tree she went off silently and joined her mate on his tree-top perch. We then proceeded with our business, raising a twelve-foot ladder to the upper platform and mounting it there, in the hope that by its aid we might see the eggs in place, as the Eagle had left them. Since this platform rises 95 feet above the ground, and 14 feet above the level of the nest, this ladder would easily carry the eye 15 feet higher; but at even 29 feet above the top of the eyrie, we could not detect the eggs within it, so completely were they concealed with the thick cover of straw and stubble. As it is a slow, difficult and rather hazardous task to climb the nest-tree we resolved to take no further risks with the eggs during the present season. While on the upper platform at this time I saw an interesting performance—the male Eagle assailing the female, rising above her, striking at her with talons extended, in anything but

an amorous manner, and apparently trying to induce her to return to her eggs.

On April 21, two weeks later, I found both Eagles standing on their eyrie, and at once concluded that the eggs had hatched; this proved to be the case, for upon again ascending to our upper platform we could see two Eaglets, which from their appearance could not have been out of the shell over three or four days, feebly raising their fluffy heads above their warm bed of straw; we could only see that they were well coated with grayish white down, and that their bills were large and by contrast very black. Close to the young and half buried in the straw lay the carcass of some animal which we could not identify, but from the deep red color of the flesh we suspected that it might be a rodent.

Although this Eagle, as Audubon found by climbing repeatedly to the nest, may sit on her nest for a number of days before laying is begun, the incubation period could not have been far from four weeks, or approximately from March 20 to April 17. Since Eaglet number one left its nest for the first time on June 27, and Eaglet number two on July 1, they remained continuously in the eyrie about 71 and 74 days respectively.

IV.

The Vermilion Eagles appear to leave their habitual breeding and hunting grounds only when the usual food-supplies give out. In ordinary seasons, according to Mr. and Mrs. Buehring, they are away only from six to eight weeks, or from mid-November to mid-January; but in the season of 1921-22, which was one of the mildest on record, they were missed for barely a fortnight in the latter part of December. In the winter of 1922-23, which continued rather mild until January, both birds remained in the neighborhood, and were even seen resting on the nest itself at the very end of December.¹ That the use of the eyrie as resting place and lookout point, by force of habit, long outlasts the season of young, we know; by the same token we might expect the adult Eagles to form a strong attachment to their home-territory, and it may well be doubted if they ever leave it except under the pressure of necessity; but in this as in most other respects we should

¹ As I was informed by Mrs. F. E. Ranney

expect to find much individual variation, for in a bird of so great a range which covers the entire continent, the pressure referred to must be exerted in greatly varying degrees.

The young of most birds, when once out of their nest are, as we say, "out for good." The slender thread, which binds them to their cradle, is snapped at the moment of flight; for all such the nest has suddenly lost its meaning or at least its function, and new habits at once step in to dominate their after life; moreover, it is the young, and not the nest, which is the strong magnet to which the parents are drawn. With the Eagle, in this respect also, the case is somewhat different, for its young after their first flight are prone to return to their nest, and this they continue to do for a number of weeks, or for as long as they remain in the neighborhood. The adoption of a *nest-perch* by old and young, as noticed at the beginning of this paper, virtually introduces a new element into nest-life, for it alters the behavior of the adults, and tends to prolong the time which the young spend at the eyrie, as will be fully explained at a later time.

So far as is known young Eagles are never permitted to use the home-territory for breeding purposes unless by chance, at some future time, one should become mated to a parent; according to the testimony of other observers, after three weeks or more of semi-independence, they are effectually driven off by the old birds, when their powers of flight and of securing their own food have become well established.

To return to the first Danbury nest; one of the three Eaglets, taken by Mr. Tibbels in June, 1921, was possibly killed and was certainly eaten by the other two; at the time of our visit one of the survivors, though thirteen months old, had never acquired the necessary coordination for independent flight, and was still a captive. Anyone who was confirmed in the belief that the emblem of his country was in real life a timid creature and a coward at heart, would have revised his opinions after having attempted to approach and manage this bird. When, after cautious manipulation, it was finally released and set free upon the grass, it would endeavor to escape by making long leaps and flapping its powerful wings, but it never seemed able to rise much above the ground. When it was headed off and frustrated in these attempts it would

rush swiftly at its assailant, endeavoring to strike with its extended talons, and at the same time to deliver swift blows with the wrists of its wings; when too hard pressed, it would throw itself back, and with erected head-feathers and open mandibles, like a Hawk in a similar predicament, it would strike fiercely with both feet.

V.

As regards the reputed timidity or cowardice of the Eagle, or indeed any other animal, it is impossible to speak with any degree of fairness without due consideration of individual differences, as well as of differences in the same individual under different conditions. Probably few people would care to meet a lion in the open, particularly if unprepared for such an encounter; yet a recent traveller, who walked three thousand miles across tropical Africa, from coast to coast, has declared that the "king of beasts" is "a terrible coward, unless it is starving or has been injured." "I have seen lions," he is reported to have said, "face to face, and the beasts have raced away in terror." The difficulty with the lion, as with the Eagle, is in knowing whether the interview has been correctly timed.

Fear is an instinct which nature has bestowed rather freely for the protection of the individual and the preservation of the race; it often waxes or wanes, according to rather complex conditions, being frequently suppressed by any stronger instinct in those animals usually regarded as timid; in birds it is commonly suppressed by the instinct of guarding and pugnacity, which in many species rises during the period of incubation, and like a fever, reaches a climax not long after the young are hatched, and then gradually subsides. Accordingly a timid animal under the spur of a single instinct may at times become very bold, only to revert to its former state.

In the case of the Eagle as in so many other instances, this is further complicated by individual experience, for, in settled communities where such birds do not always escape persecution, great caution is often acquired; and their survival under difficult conditions shows that it stands them in good stead. The presence or absence of fear is thus clearly the resultant of many factors, of which individual experience is an important variable. Any climber



NEST OF BALD EAGLE, BOWL FORM, IN HICKORY ABOUT 45 FEET FROM GROUND.
KELLY'S ISLAND, OHIO, JULY 2, 1923.



who invades the Eagle's eyrie, unprepared for an attack, especially if the nest is placed low and in wild country, is liable to meet with a surprise. At times the intruder has been badly frightened, and fortunate in having only his hat snatched from his head;¹ at others, perhaps, he has been menaced only, but at too close quarters for personal comfort; again no hostile demonstrations whatever may be made. There are always one or more independent and indeterminate variable factors to be reckoned with, and the issue will depend on the character and experience of the individual bird.

Captain Bendire² has recorded the experience of Dr. William L. Ralph on the Indian River, Florida, which furnishes an interesting commentary on what has just been said. This region, long famed for its bird-life, was described as a paradise for the Eagle, at the time of his visit in February, 1886, when with the aid of an assistant he found nearly one hundred occupied nests; most of these were in pine-trees, "generally the highest and thickest that the birds could find," and usually at a height of 50 or 60 feet, the extremes met with at that point being 75 and 30 feet. Dr. Ralph could recall but one instance of Eagles attacking anyone; this was at a nest containing two young but a few hours old, and built in a large pine at Crescent Lake, where the birds would swoop down and almost strike the head of his climber, and were so very savage that one of his party became frightened, and thinking that they might injure him, shot the male, which was the fiercer of the two.

The same writer gives an interesting account by Captain B. F. Goss of two nests of the Eagle on small islands in Nueces Bay, near Corpus Christi, Texas; one of these, thought to be the work of an inexperienced bird, was on an islet which did not rise over

¹ Auk **xxi**, p. 220. The Eagles at the San Clemente Island nest, to which we have already referred, were said to have had a bad reputation for viciousness. One season at sheep-shearing time, according to this writer, an employe of the Wool Company attempted to ride to the edge of the barranca, and take a look at the young Eagles in their rock-nest; as he did so one of the old Eagles swooped down upon him, snatched his hat from his head, and flying off with it dropped it into the sea. At the time of his visit, the writer quoted approached the nest of the same bird and took a position close to the edge of the abyss, gun in hand. He was accompanied by a small dog which crouched in terror beside him as he sat on the ground; in a moment one of the Eagles swept down upon him and came within a foot of striking him in the face.

² Life Histories of North American Birds, pp. 276-278.

two feet above high water, and was little more than a sand reef; the nest "consisted simply of a few sticks laid on the bare ground, not enough to make a single tier even, and these were covered with bones, feathers and fish scales." The other nest, on an island but little larger and bearing a small solitary tree, rose "like a monument" out of the water and was visible for miles. "It was built with surprising regularity, appeared to be a perfect circle, and the sides smooth and almost perpendicular. It was built of sticks, and sloped slightly towards the center," where he said an Eaglet sat and viciously snapped at him as he peered over the edge. Both parent birds, he adds, "attacked us with great fury, screaming and striking at us with their talons." Later when an assistant was taking the eggs from a tree-nest, he continues: "he was set upon by both the Eagles and if he had not had a good stick with which to defend himself, I feel sure they would have struck him."

Precisely the same kind of variability which we have noticed in the Eagle, and apparently due to the same cause, may be seen in the behavior of a Robin, or even of a Bluebird, under similar conditions. Who would expect the ordinarily timid Bluebird to attack a person who approached its nest, at any time or under any conditions? Yet, I have known a male of this serene and gentle species to drive straight at the head of an intruder, and with such speed and fiery pugnacity that he involuntarily threw up his hands.

The Vermilion Eagles were constantly pestered by one or more Kingbirds whenever, upon approaching or leaving the eyrie, they crossed their preserves. It is a familiar sight to see the doughty Kingbird pursuing an Eagle, Hawk or Crow, now and again darting at them, pecking at their head or back and driving them from their territory. The Vermilion Kingbirds would pursue their suppositious enemy up to the nest-tree, and even alight upon its branches, and there continue for some minutes their harsh notes of protest close to the eyrie. More than once during the present season I saw one and sometimes two of these plucky birds follow an old Eagle to its tall perch, alight just above it, and as the spirit moved, dart with vim at the greater tyrant sitting in unconcern but a few feet away; at every lunge of the little Kingbird the old Eagle seemed very much bored; with the glasses I could see that

his mandibles opened just a little at each thrust. In all such cases the Eagle can well afford to adopt a policy of indifference; but when a small Hawk at Vermilion this year tried the same tactics, it met with a quick surprise, for after dodging a number of times, the Eagle opened its talons and with one thrust suddenly stopped the game and barely missed the Hawk. Under certain conditions, the Eagle, as already intimated, may appear to be wary, suspicious and timid to the last degree, but as we have also seen, such conditions do not always prevail. Both adult and young birds, when hard pressed on the ground, or for any cause unable to fly, can put up a stiff fight against any assailant.

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NESTING RECORDS OF THE WANDERING TATTLER AND SURF-BIRD IN ALASKA.

BY OLAUS J. MURIE.

Plates XVI-XVIII

WHILE engaged in field work for the Bureau of Biological Survey on the caribou and other big game of Alaska I had opportunity to gather some data on interesting nesting birds, which finally resulted in establishing nesting records of the Wandering Tattler (*Heteroscelus incanus*), and Surf-bird (*Aphriza virgata*).

On June 1, 1922, I was hunting for grizzlies in the Alaska Range at the head of Delta River, and while coming down Phelan Creek, saw a dull slate-colored bird fly by and perch on a rock at the edge of the turbulent water, at some distance. I did not recognize the bird, and although I had only a high-powered rifle, I fired at it, hoping to get enough for identification, but missed, and the bird flew on up the stream. Later, by a process of elimination, it suddenly occurred to me that it must have been a Wandering Tattler, which I had not expected to find high in the mountains.

This species was not observed again until July 9 in the same year, when the first evidence of nesting was found. This was on Jennie Creek, a small tributary of Savage River in another part of the Alaska Range. On that date a downy young was collected

(U. S. National Museum, No. 287703, Biological Survey collection). The adult was not collected for several days, in the hope of finding more young, but on the 16th this bird, which proved to be a male, was taken. I had seen the bird a number of times before the young one was found. Whenever I came near it the parent met me, scolding from a perch on a rock, driftwood stump, or the bare limb of a tall willow. Finally, on the date mentioned, I spied the little gray youngster running away over the gravel bar.

A few days later two more adults were seen on upper Savage River and one on Sanctuary River, a stream running parallel with the Savage.

In the summer of 1923 work was resumed in the Savage River district in connection with the caribou herds. My brother, Adolph Murie, accompanied me as assistant. On June 3, during a hasty visit to the place, three different wandering Tattlers were observed along the gravel bars. All scolded at my approach and I hunted enthusiastically for nests, but found none. In one instance after a period of excited scolding the bird rose high in the air and flew away to some distant point. I concluded that there were probably no nests and that the birds were merely interested in a prospective nesting site. The following day I saw another bird on Jennie Creek as I returned to Fairbanks.

A serious flood on the Nenana River delayed us so that it was the end of June before we could move into the mountains for the summer's work. On June 30 we loaded our outfit and supplies on a light spring wagon, and with a team of horses, started for Savage River. Mr. G. Buhmann, at that time a ranger in Mount McKinley National Park, drove the team and was to return with the horses after our camp was established. There was practically no road, and we got no farther than the mouth of Jennie Creek that evening, a distance of eleven miles from our starting point at McKinley Park Station. A Wandering Tattler was seen in the distance on lower Jennie Creek.

The following day, July 1, we continued up Savage River nine miles and made permanent camp. We had been on the lookout for the birds and I had pointed out to Mr. Buhmann one in the distance, that he might have an idea for what we were looking. About noon Mr. Buhmann and my brother were riding on the



1. UPPER SAVAGE VALLEY: HABITAT OF THE WANDERING TATTLER. NEST WAS PLACED ON THE GRAVEL IN THE FOREGROUND.

2. NEST AND EGGS OF THE WANDERING TATTLER (*Heteroscelus incanus*).



wagon, while I walked ahead over the usual gravel bars, when Mr. Buhmann suddenly called out to me, "Is that one of your birds?"

I turned and saw a Wandering Tattler flying away. The bird had been flushed by the horses. We all three walked back carefully beside the wagon and in a few moments spied the nest and eggs a short distance to the rear, not over six inches from the wheel track! Mr. Buhmann picked up one of the eggs, wishing, as he enthusiastically explained, to be the first one who had ever handled the egg of a Wandering Tattler. I explained that the eggs should not be disturbed until photographed and it was carefully replaced in the nest. A series of exposures was made of the nest and eggs, and we moved away some distance with our outfit and prepared our lunch. In the meantime the bird returned and settled on the nest. Several photographs were then taken of the bird on the eggs, the last one at a distance of about 10 feet or less. The nest and eggs were then taken and carried to our camping ground.

All our observations indicate that this nesting site is characteristic, that the Wandering Tattler prefers the gravel bars of mountain streams, as typified by Savage River. These rivers are rapid and split into numerous channels, sometimes in an intricate network over the gravelly valley. This nest was found on Savage River about five miles above the mouth of Jennie Creek at an elevation of about 4,000 feet. It was placed on a gravel bar about 30 feet from the nearest water, and was sunk in a shallow depression in the gravel. It was well built, unusually elaborate for a shorebird. It was composed principally of fine roots carefully woven into a firm structure, including a number of twigs around the edges. Small bits of twigs and some dry leaves had been used for lining. It was so compact that I had no difficulty in picking it up and transporting it to camp. The diameter of the nest to the edges of the finely woven body was about five inches, but of course some of the twigs extended much farther.

The nest contained four eggs, pointed ovate in form, the general coloration of which reminds one of Crow's eggs. The ground color is pale olivine to glaucous and pale glaucous, spotted with vandyke brown and burnt umber, in places becoming dull black,

again lightening to verona brown, with scattered spots of light quaker drab. The large spots are massed at the larger end of the egg, in one instance grouped in a wreath. Measurements in millimeters are as follows: 43.3 x 32.6; 44 x 31.5; 44.3 x 31.6; 44.5 x 31.6. The eggs were well advanced in incubation.

On the same date Adolph Murie prepared two specimens of the downy young, secured on another gravel bar. I judge these to be from two to three days old—field Nos. 21 and 22 (not yet catalogued in the U. S. National Museum). These downy young may be described as follows: under parts dull white with a faint indication of grayish on upper breast and lower fore neck; upper parts pale gray, with a very slight suggestion of buffy on wings, rump, and tail, more evident in the fresh specimens than in the skin; upper parts narrowly, irregularly, and indistinctly barred with blackish, with dull black loreal and postocular streaks and with irregular black spots on hind pileum. In a colored sketch made from freshly killed bird, tarsus and upper part of toes appear dull glaucous green; the under surface of foot olive yellow; bill dull glaucous blue.

At least three pairs of Wandering Tattlers nested on Savage River, perhaps more; that is to say, three nests, for both adults were never seen together, and it may be that only one looked after incubation and care of the young. However, the adult secured with the downy young in 1922 (U. S. National Museum, No. 287014, Biological Survey collection) was a male, and one would ordinarily expect the female to remain with the nest also. This is a point which was not determined.

No more eggs were found, as the other birds under observation had completed incubation. We were very busy on other work higher in the mountains and did not have an opportunity to study these birds as thoroughly as one would like. As we passed up and down the river during the summer the birds were observed on many occasions, both adults and young. Near our camp was a muddy spring, a caribou lick, from which flowed a remarkably clear, cold brook. A Wandering Tattler often flew by our tent to this spring, evidently to feed. Aside from this instance the birds were invariably found on the gravel bars, usually near the water's edge.

Whenever I approached the home grounds of a Wandering Tattler he would fly to meet me and would scold excitedly, uttering a vigorous *deedle-deedle-deedle-dee*, with variations which I failed to record minutely. At such times a whistled "cheep," imitating a chick, would bring the excited bird within a few feet, and photographs were secured in this way. On July 30 I saw a young bird, still downy. On August 8 one young bird was fully feathered and was seen on several occasions afterward. The last appearance of the Wandering Tattler for the season was on September 19. There was some doubt whether or not this was an adult.

It is unsafe to draw any definite conclusions about the breeding range of this species, with nesting data from only one locality. However, judging from indications, one may make a guess. It is practically certain that the bird observed on Delta River in 1922 was of this species; Charles Sheldon secured a female at the head of Toklat River, May 22, 1908; and there were several on Sanctuary and Savage Rivers and Jennie Creek as described above. Practically all the streams emerging from the Alaska Range have certain characteristics in common. They are rapid, divided into many channels, flowing through gravel formation. Observations indicate that such is the environment chosen by the Wandering Tattler; and it is possible that the nesting range will be found to extend over most of the Alaska Range, on the north slope particularly, but possibly also on the south slope. Further work will no doubt reveal nesting areas from many other parts of at least this mountain chain. I have not visited the Endicott Range in the summer season, and have little data on the nesting birds of that region.

Observations on the Surf-bird were not extensive, but enough was learned to show the location of its breeding grounds. My first experience with this bird was on McKinley Creek, a tributary of Middle Fork of Fortymile River, July 13, 1921. With a companion I was travelling over the hills of that region, studying the caribou on their summer range. We carried packs on our backs and had five dogs, each with a small pack. On this date we were descending a slope above timberline, headed for the timber to camp for the night. Suddenly two birds jumped out before us

and made an outcry, circling about. My first impression was "Turnstones," but later I saw clearly that they were Surf-blrds. We put down our packs and hunted for a nest and young, and were presently rewarded by seeing a downy young one striding away bravely over the rough ground. After securing the young I shot one of the adults, which I found to be the male. No more young birds could be discovered and we finally went down to the timber to make camp, as darkness was approaching.

The young bird was probably from five to seven days old with pin-feathers appearing on scapulars, wings, and sides. Under parts dull white; upper parts clay color, in, namon buff, and dull black, in an irregular speckled pattern, with rather distinct white spots over the lower back, rump, and thighs; crown white on anterior portion with two definite median black spots; posterior part of crown mainly dull black spotted with white and clay color; a black loreal streak and black rectal streak, with some other blackish spots on side of head, which probably form a definite pattern in life.

This description is based on the dried skin, now entered in the U. S. National Museum as No. 286764, Biological Survey collection. The adult is No. 286767 in the same collection.

The nesting ground of the Surf-bird is very different from that of the Wandering Tattler. The Surf-bird was found on a gentle slope of a high hill, a considerable distance above the timber, where the ground was covered with a lumpy growth of mosses, grass, and other low vegetation. Perhaps we may term it a "mossy" type of vegetation.

This was the only time I found the Surf-bird in the Fortymile region, but on August 15, 1921, another was seen in the hills between the upper Chena and Chatanika waters. When I flushed this bird on a bare hilltop it appeared so perfectly fearless that I tried for a photograph. It flew only a short distance each time I approached and seemed attached to that vicinity, but finally I lost sight of it behind a rocky point. I could not be absolutely certain, but I judged this to be an immature bird and probably not far from its nesting ground.

Surf-birds were seen once more, this time high in the Alaska Range at the head of Savage River, July 4, 1923. A flock of twelve, evidently non-breeders, were feeding on a high slope. I had

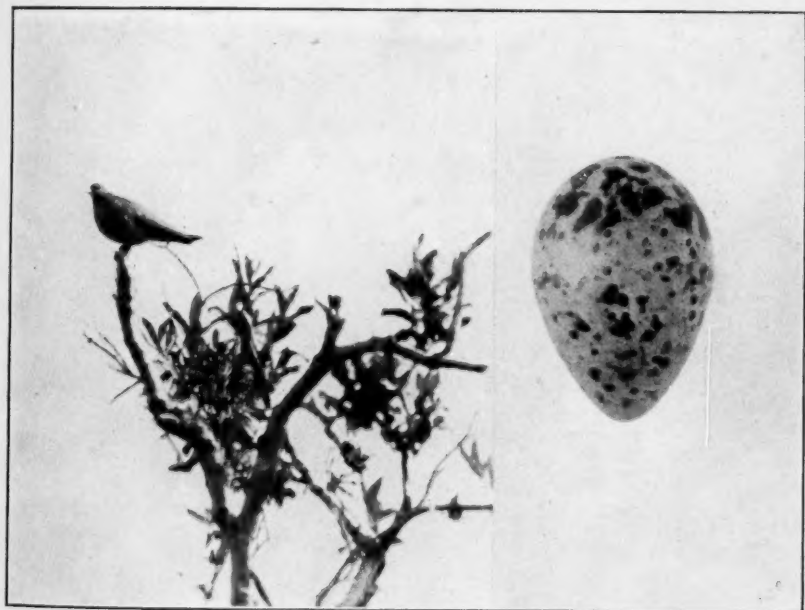


WANDERING TATTLER (*Heteroscelus incanus*).

1. FEEDING ALONG WATER'S EDGE.

2. ON NEST, INCUBATING EGGS.





1. YOUNG OF THE WANDERING TATTLER.
2. WANDERING TATTLER SCOLDING FROM WILLOW BUSH, ON
NESTING GROUND.
3. EGG OF WANDERING TATTLER, SLIGHTLY REDUCED.



nothing but a big rifle, but secured a specimen with a hard-nosed bullet.

These observations establish one nesting record for the Surf-bird, but we may venture to infer from the meager data obtained that this bird nests, though perhaps rarely, on the high mossy slopes in the region between the Yukon and Tanana Rivers. These mountains are generally not rugged, but rounded, with timber confined in many localities to the creek valleys. The birds seen in the high Alaska Range were not nesting, but their presence there may be suggestive. Many of these high mountains have slopes covered with the same type of vegetation as that on McKinley Creek, and it is probable that later observations will prove the Surf-bird to be a summer resident of that section.

Bureau of Biological Survey,

U. S. Dept. Agriculture, Washington, D. C.

A VISIT TO TOM LINCOLN'S HOUSE WITH SOME AUDUBONIANA.

BY CHARLES W. TOWNSEND.

ON June 27, 1833, Tom Lincoln brought to Audubon at Natashquan, Labrador, a sparrow he had shot which was at once recognized by the naturalist as a new species, and was named by him Lincoln's Finch. Tom Lincoln's name is well known to ornithologists only in this connection, and little is known about the man. In a recent visit to his son, Dr. Arthur T. Lincoln, at the old homestead at Dennysville, Maine, I found many memories of him and of Audubon and of the Labrador trip.

In 1636, Tom's ancestor, Thomas Lincoln, came from the west of England and built a house at Hingham, Massachusetts, a house that is still standing and still occupied by a Lincoln. Tom's grandfather was General Benjamin Lincoln of the Revolutionary war. His father, Theodore, with James Russell and Thomas Lowell in 1786 bought two townships about the mouth of the Dennys River near Eastport, Maine. Here Theodore, called the Judge, built his house on a knoll that commanded a beautiful view

down the river towards Cobscook Bay, and up the stream to the lumber mill in which his fortunes were built. Here Tom was born on March 27, 1812.

It was probably through the Shattucks of Boston that Audubon came to know the Lincolns, and through the Lincolns the schooner *Ripley* was engaged in which Audubon sailed from Eastport for Labrador on June 6, 1833, taking with him Tom Lincoln, George C. Shattuck, William Ingalls, Joseph Coolidge and his own son, John Woodhouse Audubon, all young men.

Mrs. Audubon, who had come to see her husband off on his Labrador trip, spent most of that summer at the house in Dennysville, and there is a tradition that they had both visited the Lincolns the summer before. A worsted lamp mat, far from artistic it must be confessed, is treasured as an example of Mrs. Audubon's handiwork during her second visit. A small horn spoon, a gift of hers, is the only other tangible memento of her visit, but one can easily picture the great naturalist sitting before the blazing logs in the huge fireplace, eagerly discussing plans for his long contemplated trip, and his fine and devoted wife patiently waiting in the old house for his return.

The house is large and built on generous but simple lines, a plain peaked-roofed house with the door in the middle of the broad side. The rooms are large with great open fireplaces—there were at one time sixteen in the house—high wooden mantelpieces, and wainscotting, and they are filled with fine old furniture—secretaries, highboys, four-post beds and the like. Old portraits and engravings hang on the walls, but Tom's likeness, such was the austere modesty of the man, is represented only by an old Daguerreotype, the sole portrait he reluctantly permitted to be made of himself.

The old kitchen is kept as it was in Audubon's day. There is an open fireplace where one can look up and see the stars through a chimney where Swifts roost in great numbers, heedless of the smoke; there is an immense brick hearth where, in Tom's day, Passamaquoddy Indians often slept before the fire, entering the doors which were always hospitably left unfastened; there are cranes and skillets, great iron pots and huge frying-pans with handles nearly four feet long, broilers and toasters, bellows and tin lanterns and tallow dips.

A journal, kept by Tom on the Labrador trip, reveals him as a man of considerable scientific attainments as a naturalist, while a few of his water color sketches of shells and of birds show that his artistic talents and regard for accuracy and detail were of superior quality. These characteristics of the man are generally unknown and they fully justify Audubon in honoring him in naming the new sparrow.

Dr. Lincoln told me that his father was extremely modest about his own attainments and that he had destroyed many of his sketches and had cut from the book the pages of his journal, intending to burn it, but, fortunately, part of it was saved. It is all interesting reading and I have transcribed a few passages:

"June 18 [1833]. We left the vessell [at American Harbor or Natashquan] this morning and proceeded along the shore among the Esquimaux [Mingan] Islands towards the south west. We soon came across three small islands on two of which the *Sterna hirundo* bred in considerable numbers—they lay two, seldom three, eggs much resembling in form and colour those of *Larus marinus*—they lay in the grass without forming any nest, keep up a great outcry when disturbed, flying over our heads above the reach of our guns."

"July 4. Mr. A. finished a drawing of a new finch which I shot at Esquimaux Islands, there are several rare and beautiful plants peculiar to the country represented upon it."

"August 6. John Audubon, Coolidge and myself went about four miles to the river which is put down on the Chart as the largest on the coast [Blanc Sablon] and found it a mere rocky brook. . . . [There is] a beautiful little waterfall of about thirty feet. Like true Yankees we cut our names in the rock that if perchance some luckless fellow should wander so far away from the habitable part of the earth he should find that he was not the first outcast."

"Aug. 9. Today in a small brook near our vessell we caught a mess of the finest trouts we ever saw but paid dearly for our sport being nearly destroyed by the black flies and musquitos."

"Aug. 11. We bid adieu to Labrador without much regret probably never to see that wretched country again. We had been disappointed in every thing concerning it. Indeed we had never the truth told us concerning any one thing and it was only the

outrageously exaggerated accounts and in many cases stories wholly without foundation that induced us to come hither. We were told that the sea birds of nearly all kinds that live on the coast of Maine were so abundant at Labrador in the breeding season that we should have no difficulty at any time of getting any number we might want. The Esquimaux were represented to us as innumerable, and it was constantly reported that Chevalier [at St. Paul River] had more than two hundred constantly in his employ. The Moravian settlement which makes such a figure in the accounts of Labrador and which is reported to have made such an improvement in the condition of the Esquimaux, and to be of such magnitude and importance in the country was equally magnified in our eyes before learning the true state of the case. But instead of all this the birds excepting two or three species were *exceedingly* rare, so scarce that with all our exertions we failed in getting one fifth as many as we intended. As to the Esquimaux, we did not see *one* and there was not one within a thousand miles of us. The hopeful 'Moravian Settlement' consists of five miserable wretches who being clothed and fed by those who know no better are content to lay torpid like toads in their holes; they cannot do the Esquimaux much harm for there is not one within two hundred leagues of them. As for the latter it is no wonder that there is none on this part of the coast: it is impossible for them to exist. For the Hudson's bay Company have destroyed every living thing on the land. . . . When the fish are destroyed as according to present appearances they soon will be and the birds too, what will then be in Labrador. The destruction of fish by the cod fishers, of the birds by the *eggers* and men employed in getting feathers is too *wicked*."

Dr. Lincoln has some interesting reminiscences of his father whom he always thought looked like Abraham Lincoln, and, curiously enough, wrote like him. In his later life he almost never used a gun but kept up an interest in birds and everything else in nature until the day of his death, although this interest was eclipsed by his work in the antislavery cause. Once, in his early youth, the Doctor asked his father what sort of a man Audubon was, to which he answered after a moment's hesitation, almost as though to himself: "He was a nice man but Frenchy as thunder."

"In after years," said the Doctor, "I asked him about his 'Frenchy' remark and came to the conclusion that he referred only to that emotional manner that so many of that race have."

I was shown a pamphlet autographed by J. J. Audubon entitled "An account of some experiments made on the habits of the vultures inhabiting Carolina, the Turkey Buzzard, and the Carrion Crow particularly as it regards the extraordinary powers of smelling, usually attributed to them" by J. Bachman. This pamphlet confirms Audubon's experiments which show the lack of the sense of smell in these birds, an opinion which was severely criticised abroad.

The following letter from Audubon to Tom in Dr. Lincoln's possession shows Tom's interest in birds and other objects of Natural History, as well as Audubon's affection and respect for Tom.

Charleston, S. C., November 7, 1833.

My dear Thomas—Your letter of the 22d Octr gave me much pleasure and I thank you for it—Since here we have found the *Wood Wren* in Winter quarters and pretty abundant—My friend John Bachman presented me with a new *Sylvia* and Doer Townsend of Phila with a new *Emberiza*; the latter quite a handsome species—I have added 4 species of Water birds to my collection since I saw you—These although not new are very rare in our Country and never were seen before although they had been indicated—I am glad that *Parus hudsonicus* is found in your vicinity, and I assure you that I should be grateful to you for a few good skins of that bird—as many of the Pine Gros beak, White winged, and common Cross beaks and Canada Jays as you can or will spare me—I am sadly in want of Northern Owls and Hawks also—I think that we have 2 species of *black headed Titmouse* (*Parus*) in the U. S. and believe that the northern one differs from that found in the South—be so good as to shoot a few and send the skins and *measurements* taken before the birds are skinned—

You paid John your portion of the Lepraux expedition expenses—In a few weeks I will ship you a box of *Southern* bird skins which I hope will be welcome to you, as they will all be new to you—Should you meet with the Willow Grouse, let me know—I hope that your Brother & our friend Harris have had good success in Hunting and fishing with old Clark—I have written to Ed Harris to join me in my next expedition but have got no answer—I am sorry that you cannot come for I think it would be an excellent oppy for you to see the Country &c—how is your Brother the Doer? remember me to him and to the rest of your family—remember me to Wm Curtis also and to Capn Emery & Coolidge, as well as to Joseph—what is he doing—ask of him to write to me at this place promptly—

You will receive some shells from the Floridas along with the Bird skins in a few weeks—

Adieu God bless & prosper you—

Your friend

J. J. Audubon.

To

Thomas Lincoln Junr Esq

Dennis-ville near Eastport Maine

98 Pinckney St., Boston, Mass.

RECOGNIZING INDIVIDUAL BIRDS BY SONG.

BY ARETAS A. SAUNDERS.

IN the past few years considerable interest has arisen in those problems of bird life that can only be satisfactorily answered by tracing the movements of individual birds. The method of trapping and banding birds has awakened much interest, and results from such work are now appearing. In this connection a question has occurred to me, and probably to others. Is it not possible to recognize and trace the movements of individual birds by other means than banding?

I do not mean to propose any substitute for banding, for no return record by other means can be so satisfactory and indisputable as that of a bird bearing a definitely numbered band. But it would seem entirely possible to supplement the work of banding by other means, that, even though less satisfactory in a general way, would prove of value, and might solve problems that could not be solved by banding.

Occasional individual birds differ so distinctly and peculiarly in song from all others of their species that the species of the singer is not recognizable till the bird is seen. Once such individuals are known they are clearly marked, and returns to definite localities can be obtained from them. Similar returns might also be made from birds of unusual plumage. Some returns of this sort have been put on record in ornithological literature. (For example see Mailliard, *Condor*, XXII, pp. 38-39.)

But aside from these unusual singers, individual variation in bird song is great enough so that it would seem possible, in some cases at least, to trace individual birds by the peculiarities of their songs. To find out if such a method was practical, I started in the spring of 1920 to record the songs of individuals, and to attempt to keep track of them by this means. The results have proved extremely interesting. While I cannot report that the method can be easily applied to all species, there are a number to which it can be applied with satisfactory results. It not only helps to trace the movements of individuals, but also opens up a wide field of unsolved problems in bird life, a field that seems inexhaustible in its interest and opportunities for new discoveries.

I began my work by concentrating on certain species that seemed to promise the most success. For each species I chose a letter and for each individual a number. Thus, F, S, M, and W, stood for Field Sparrow, Song Sparrow, Meadowlark and Wood Thrush respectively, while F1, F2, F3, etc., stood for individual Field Sparrows, and similar combinations for individuals of other species. I carried in my note-book a map of the country in which I was working, drawn on a scale large enough to show details of buildings, streams, fences, roads and other land marks. On this map I wrote the letter and number of each individual, at the point where its singing tree (See Mousley, *Auk*, XXXVI, pp. 339-348) or headquarters (See Howard, 'Territory in Bird Life,' pp. 127-129) was located. In my note-book I recorded by the graphic method (*Auk*, XXXII, pp. 173-183) the songs of each individual, the dates on which I found it singing, and any other notes that would prove of interest or value.

Individual variation in bird song is of two distinct kinds, variation between individuals and variation on the part of the individual. Both kinds may be found in a given species. The problem of recognizing the individual of that species by its song depends on the extent of these two kinds of variations. *The greater the variation between individuals and the less the variation on the part of the individual, the more easily and certainly can the individual be recognized.*

I have not attempted to work out this problem with many species, as it is obvious that better and quicker results could be

obtained by concentrating on a few. In some cases, recognition of the individual proves comparatively easy. In others it becomes possible only after a considerable amount of field work. In still others it is practically impossible. To illustrate these various conditions I have chosen five species with which I have experimented.

The Wood Pewee (*Myiochanes virens*) illustrates a species in which variation between individuals is too slight to be used in recognition. There are some interesting variations to be found in this species, but they seem to be such as are within the individual and seasonal in character. Of a number of records made from different individuals at the same season of the year, the majority are likely to be almost, if not exactly, identical. An occasional bird might have a song so individual that it could be recognized, but for the species as a whole this cannot be done. This also seems to be true with other species of *Tyrannidae* with which I have experimented.

The Meadowlark (*Sturnella magna magna*) illustrates a totally different condition. The "Spring o' the year" song is short and easily recorded. The pitch of the notes is clear and definite. Variations are numerous. It seemed, when I began the study of this species, that recognition of the individual would be comparatively easy.

To begin, I chose a bird that sang daily from a certain apple tree that stood alone in the middle of an open field. The first day this bird sang nine different songs, all of which I recorded. Returning a day or two later I recorded seven more songs, none of them at all like the nine of the previous visit. In a few days I had recorded nearly thirty different songs from the bird, or possibly birds, that sang from that apple tree. Not once was a song of a previous day duplicated. The following year, 1921, I tried again. I chose a bird singing in a definite locality and began a record of its songs. After collecting a few songs day after day, on the 28th of April, when the bird's song was at its height, I recorded songs for nearly an hour, obtaining fifty-three distinctly different ones, only two of which were repeated, having once been dropped for another song. If the bird singing from that particular headquarters was always the same individual, then I recorded

ninety-six different songs sung by it that season! Of these ninety-six, only seven were repeated on two different days and only one on more than two different days. Of the seven repeated songs all but two are common Meadowlark songs, songs that I have recorded over and over again from many individuals and in widely separated localities. There was nothing that I could learn about the song of this particular individual that would help me to distinguish it from other individuals of its species.

There was no reason to suppose that this bird was in any way unusual. It seems to be a common thing for individual Meadowlarks to possess a large number of distinct songs. Nor was there reason to think that the number I recorded, ninety-six, was anywhere near the limit of the bird's repertoire. Three other Meadowlarks that sang within hearing of this bird evidently possessed a large number of songs each, though I made no detailed study of them. It is interesting to note, however, that ten of the first bird's songs were sung by one or more of the other birds at times.

At the end of the season of 1922 I had made records of four hundred and seventy-eight different Meadowlark songs. I still find, however, that at least half of the songs I record are new, and not duplicates of others. One hundred and twenty-six of these songs have been duplicated in my records at least once, and some of them many times. Out of thirty-three songs recorded in Cattaraugus County, New York, twelve are duplicates of records from southern Connecticut. Thus, though my work has brought out a number of interesting facts concerning Meadowlark songs, it has convinced me that variation within individuals is so great, and variation between individuals so slight, that recognition of a normal individual Meadowlark by its song is impossible.

The Field Sparrow (*Spizella pusilla pusilla*) presents a totally different case. I have already discussed this song and its variations (Auk, XXXIX, pp. 386-399). There is wide variation between individuals but only slight variation that is mainly seasonal on the part of the individual. The majority of Field Sparrows seem to possess but a single normal song, sung regularly throughout the song period. In three years of study of individuals, I have met only three cases where birds possessed two distinctly different songs, and no cases where there were more than two.

Were it not for the fact that many of the simpler songs are possessed by several individuals, recognition of the individual would be always easy. It is common to find two or more birds breeding in a certain area and possessing songs that are of the same type, and often exact duplicates, as nearly as the ear can distinguish. Such birds cannot be traced with certainty. In a single season they may be known by their choice of singing tree or headquarters, but these are likely to change the next year. There are, on the other hand, many individuals that possess songs that are distinctly individual in character, so unlike any other Field Sparrow song in some definite particular, that the individual is marked and easily recognized, not only from day to day, but in a second season.

In the season of 1920, at Fairfield, Conn., I recorded the songs of one hundred and nine individual Field Sparrows, and marked their locations on my map. Many of these birds were too far from the roads I travelled daily or with regularity to be traced successfully, but I obtained altogether forty-one repeat records in that year, to use the terms repeat and return as does the Biological Survey in trapping and banding work. Some of the birds repeated daily or almost daily for a long time, and became well known to me. Eighteen of these birds returned the following year, occupying essentially the same headquarters again. Of these eighteen, eleven possessed songs so individual that I had no doubt of their identity, but the other seven had simple songs not certainly individual. In 1922 I obtained six returns of birds first studied in 1920, three of which are undoubted because of the marked individuality of their songs, while the remaining three are doubtful. This makes about 10% of returns the second year, and 2.8% the third year. If I had considered only those birds located where I could visit them regularly and almost daily, I should have obtained a much higher percentage of returns. Of forty-two new individuals first studied in 1921, all of which were located where I could visit them frequently, nine returned in 1922, a distinctly higher percentage.

In addition to the mere fact that birds return to the same locality, many other interesting points were noted. An example will illustrate some of these. The first Field Sparrow that I put on record in 1920, my original F 1, proved to be one of the most interesting. Its song, first recorded on May 2, was used in the

illustrations of my article on the song of this species as number 15 (Auk, XXXIX, p. 390). I have already commented on its peculiarly rhythmic character, a point that distinguished it immediately from other Field Sparrows. In all my Field Sparrow records, now numbering between two and three hundred, I have only two other songs at all like it, and these are easily distinguished by constant differences in pitch.

After recording this bird on May 2, 1920, I did not again hear its song for a long time, so long that I decided the bird must have been a late migrant that had moved elsewhere. When it did sing again on June 14 I had forgotten the original record, and recorded it as F 61. Not until the following fall, when going over records, did I realize that F 1 and F 61 were identical, both in song and in headquarters. I had recorded a number of repeat records of F 61 from June 14 to July 25. Its silence from May 2 to June 14 may at first seem remarkable, but a study of this and other species has convinced me that such a phenomenon is really very common, and except for the fact that it began a little earlier than normal in this individual, it is entirely regular and to be expected.

The next spring, on March 27, a Field Sparrow appeared in the vicinity of F 1 headquarters, singing a type IV song of only two parts. This bird I recorded as F 115, and began to record repeat records daily. In about a week it began sometimes to add a third part to its song, when the song was identical with that of F 1. A few days later the two part song was entirely discarded, and I felt sure that my bird was F 1. Observation has shown that this curtailment of the song early in the season is a common phenomenon, both in Field Sparrows and other species. It might be termed prenuptial variation.

In the season of 1921 this bird sang regularly till April 29, but was silent from then till May 24, sang a little that day, and was not heard again till June 8, when it began a second period of song, and sang regularly till the end of June when I left Fairfield for the summer and was unable to keep further track of it. In 1922 this bird arrived on April 6, singing some prenuptial variations at first, mainly consisting of the regular song with three, six and nine notes to the part, rather than four, eight and twelve. By April 14

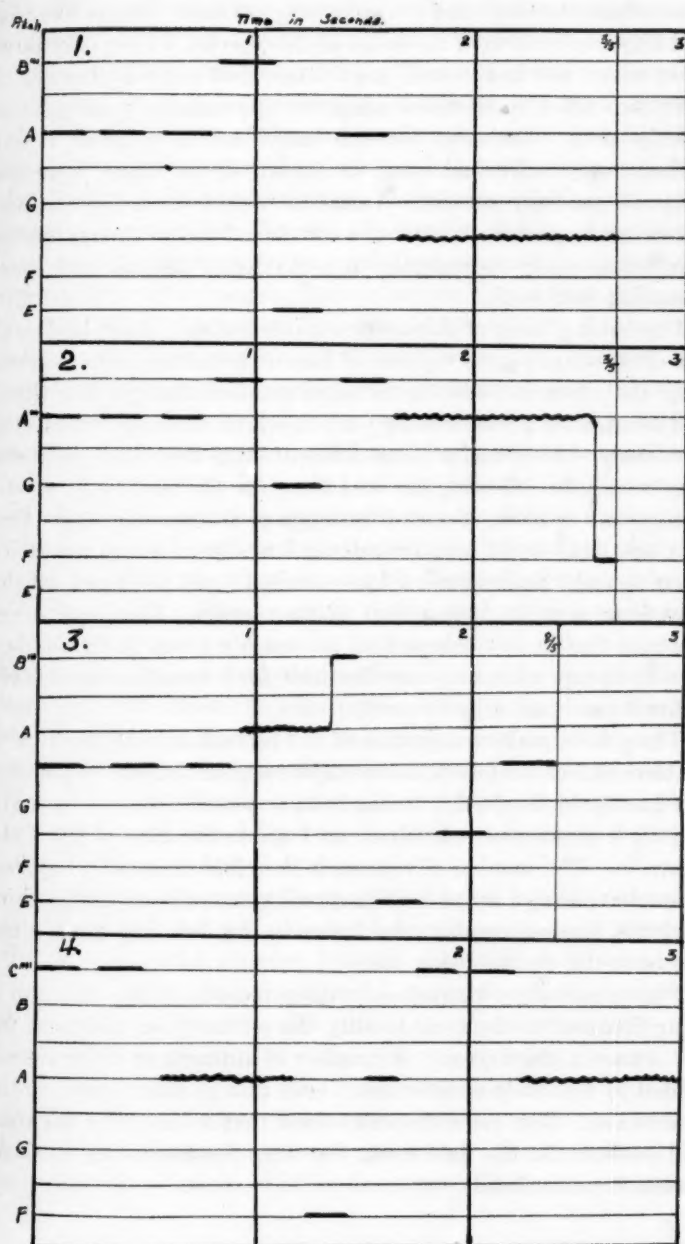
the bird was singing its normal full song, and continued till May 8, then ceased till June 3, sang a little that day, and on June 15 began a second period of song, which again lasted till I left for the summer at the end of June.

This irregularity in song period is what I have referred to as the individual song period. (Auk, XXXVIII, pp. 283-284.) Every Field Sparrow I have studied individually has exhibited it, though the periods come at different seasons, and last sometimes longer, sometimes shorter times. As previously stated, it is my opinion that these periods of song and silence have a definite relationship to nesting. It is common in many other species as well.

By a study of this individual I obtained not only the fact that it lived in the same locality three successive summers, making use of the same singing tree each year, but also the date of its return two of the years, notes on its individual song period, and on its variation from the normal early in the season.

Field Sparrow songs such as those numbered 1, 6, 8, 12 and 17 in my previous article on the song of this species (Auk, XXXIX, p. 390) are so common, at least in southern Connecticut, that it is impossible to trace individuals that sing these forms. In 1920 I found two birds in a certain area singing a type IV song like number 17. They were in close proximity and I did not succeed in locating the headquarters of each definitely, for the birds changed their locations slightly, so that I never felt sure which was which. On April 5, 1921, there were seven Field Sparrows singing in this locality, and four sang duplicates of the songs of last year, and the three others sang songs of the same type, but with slight variations. An eighth bird in the vicinity sang a totally different type II song. With this number of birds about, all singing so nearly alike it was impossible to keep track of individuals. It is this fact concerning the simpler forms of Field Sparrow song that makes work with this species not always certain.

The Song Sparrow (*Melospiza melodia melodia*) requires much more field work in the recognition of individuals than the Field Sparrow. Records of its songs are more difficult to make with accuracy. Variation both between individuals and within the individual is great. Each individual has a number of totally distinct songs, and often minor variations of the same song. Yet



SONG SPARROW SONGS.

cases where two birds sing the same song are rare. In five hundred and fifty-two records of the songs of this species, I have only three cases where two individuals sang songs that were duplicates. I have two other cases where songs are approximately though not exactly alike. Variation between individuals is so great that I believe every individual could be known by its songs, were the songs all carefully studied. Variation within the individual, the possession by each individual of a number of distinct songs, makes a sufficient study to recognize it a matter of difficult and time-absorbing field work.

The habit of song of this species is interesting. Each bird sings one of its songs over a number of times, then changes to another, sings that over and over in the same manner, changes to a third, and so on, after a time coming back to one of the songs it had sung previously. After half a dozen different songs have been sung, one may return the following day and recognize the bird by its repetition, sooner or later, of one of the songs of the previous day. One may add daily to its song records until nearly its entire repertoire is on record. Individuals I have studied have possessed all the way from nine to twenty-four distinct songs. One may never feel sure that he has recorded all the songs a given bird sings, but he may be sure when he is near the limit, for it becomes increasingly difficult to obtain a new record.

These facts make recognition of the individual Song Sparrow a matter of much field work, but once its songs are known its identity can hardly be doubted. It has been impossible for me to study any such number of individuals as I did in the case of the Field Sparrow. The number of returns is therefore necessarily smaller. There have been a number of disappointments when some favorite bird was studied carefully for hours in the field and then could not be found the following year.

I have actually obtained only three records of the return of a Song Sparrow to the same locality the second year, and none for the return a third year. A number of interesting facts are revealed by the study of individuals even though they do not return in all cases. The general results show that to one who has time and patience for the field work, the Song Sparrow is an excellent species for experiment.

In May, 1920, I noted a particular Song Sparrow singing in an open lot back of my home in Fairfield. I recorded its songs and entered it in my note-book as S 4. Though I spent much time in study of this bird I succeeded in obtaining only nine different songs, an unusually small number when compared to other Song Sparrows. Further than that, this bird had one favorite song above all others, and sang only that one the great majority of the time. This song is number 1 in the illustrations of the songs of this species. The bird sang it so much that it was difficult to obtain records of its other songs. This particular song, however, became so well known to me, that I recognized the bird by it alone, and kept records of its presence all through the months of May, June and July till August 3, when it was last heard that year. Other birds of this species sang that year till August 13, so that this bird ceased ten days earlier than the last of its species to be heard.

On March 6, 1921, I was delighted to hear the familiar song of this bird from its old headquarters in a small bush back of my home. The bird was heard singing both the 6th and 8th, and then ceased till the 17th, when its song was curiously curtailed by the omission of the middle one of the three introductory notes, leaving a pause there instead of a note. A few days later the bird added this note again, and dropped the final series of notes, substituting a single short note on the same pitch. The bird continued singing in this manner till March 31, then became silent, or perhaps absent, till April 16, when it began again with the full song, sang a day or two in late April, but was not singing regularly till May 3. From then till June 30, when I left for the summer, it sang in full vigor, and was recorded daily.

Having only nine songs for this bird I tried, in 1921, to study it more carefully and get records of any other songs it possessed. But in spite of this attempt I obtained only three different songs that year, every one a duplicate of one of the nine recorded the previous year. In 1920, the bird had sung its other songs with fair frequency, particularly early in the morning, but in 1921 the greater part of the time I could hear nothing but the one favorite song. It was a disappointment when 1922 came around, that this bird not appear in its old place. Another bird, with a different set of songs, and a somewhat different headquarters.

occupied the locality. This bird possessed one song peculiarly like the favorite one of the bird of the two years previous, particularly in time characteristics, but differing in pitch. I have included the record of this song in the illustrations as number 2. I have often wondered whether the similarity of these two songs might be due to relationship, or merely to accident.

On June 3, 1921, I started on a trip to the shore. As I left my home the S 4 bird was singing in his accustomed place. As I neared the edge of a salt marsh a good half a mile away, I was surprised to hear this same song, with which I had become so familiar, from another bird. The song was a duplicate in every way except that this bird added a single terminal note, one tone lower in pitch than any previous portions of the song. This is one of the three cases I have known where two Song Sparrows had duplicate songs. I heard no other song from this bird, and was unable to find it on other dates either that year or the following. Here is another case where possible relationship between the two birds may have been the cause of similar songs.

The peculiarity of the S 4 bird in singing one song almost to the exclusion of all others I supposed was entirely individual. In 1922, however, I obtained return records of another Song Sparrow I had first studied in 1921, and found a somewhat similar case. I had recorded twelve songs in 1921, no one of which appeared to be a particular favorite. In 1922 it returned and, so far as I knew, sang only one song, the song recorded as number 3 in the illustrations. Its return was not noted until May, but since it was not near my home, as was the other bird, I might easily have overlooked it before that date. The experience with these two birds has led me to think that young Song Sparrows in full vigor sing a great variety of song, but that as they grow older the variety becomes gradually less till they sing but a single song. Perhaps the number of songs possessed by an individual is a clue to its age.

This second bird showed another interesting fact. In 1921, it sang regularly from the top of a small elm along a roadside. In 1922, it had moved to a different location, a telephone wire about 50 yards further along the same road. Such a change of headquarters from one year to another may not be an uncommon phenomenon. Changes might easily be made for greater distances

than this one. If a Field Sparrow changed its headquarters any great distance, I should feel doubtful about its identity, owing to the fact that songs of so many individuals are nearly identical. But in the case of a Song Sparrow, with a whole repertoire of known songs, the individual ought to be so well known as to be recognized even at a considerable distance from its old headquarters.

Repeat records of Song Sparrows are easily obtained, and usually not of special interest. One however was interesting. A bird I had not studied particularly, nor even given a number, sang a certain song which was rather peculiar in rhythm, and in the fact that the notes were pitched on the notes of a major chord. The song is number 4 in the illustrations. The bird was noted singing this song in a definite locality June 19, 23, and 24, 1922. This was the only one of its songs recorded. On October 14, 1922, the bird sang again from exactly the same place. I had forgotten it, and its song, but since it sounded familiar I made the record, returned and searched my records for a song like it, and found the former record an exact duplicate, both as to song and locality. A bird then may remain in its summer locality and sing from its headquarters in October, after both the mating season and post-nuptial molt are over.

The Song Sparrow proves to be a species whose individuals can be recognized by song almost without question. The chief difficulty lies in the great amount of field work necessary to study each individual. Out of three birds studied quite thoroughly in 1920, and six more in 1921, I obtained altogether only three returns, none for more than two years in succession. The number of birds studied is too small, however, to arrive at any definite conclusion as to the percentage of returns possible.

The Wood Thrush (*Hylocichla mustelina*) presents a still different case. The song of this bird consists of a series of phrases sung at short intervals. Each phrase may have three parts, an introduction of two or three short notes, usually low in pitch and not especially musical; a central phrase of two to five notes, most commonly three, loud, clear, flute-like and extremely musical; and a termination of three or four notes, usually high-pitched, not so loud, and generally the least musical part of the song. Phrases may be sung either with or without either introduction,

termination or both, and sometimes, especially late in the season, birds indulge the habit of singing only introductions and terminations, leaving out the beautiful central phrases.

The central phrases of the Wood Thrush song are the most noticeable part, and since they are louder and carry farther, are sometimes the only part heard. They are usually quite perfectly pitched according to the intervals of human music, and are consequently easily recorded. Between the notes there is usually an l-like consonant sound, which I represent in diagrams with a loop. I begin my study of an individual's song with its central phrases. Each bird has from two to nine different ones. They are sung in no definite order, but it is not common for one phrase to be repeated immediately without some other intervening. The bird usually shows preference for one or two of its phrases and sings them more frequently than others.

When central phrases of an individual are all, or nearly all recorded, I pay attention to the terminations and introductions. There are, in normal birds, two or three introductions and four or five terminations, and these are sung with first one phrase and then another, then omitted entirely. The individual may be identified by central phrases alone, but the addition of introductions and terminations to the record will make one doubly certain of the identification, and will add much of interest to the study of the bird's method of singing.

The illustration shows the central phrases of five different Wood Thrushes that sang in a certain wood in Fairfield in the season of 1921. I have arranged them so that phrases that are nearly alike in different individuals occur in the same or nearly the same vertical column, so that comparisons may be more easily made. The phrases are not in the order in which they are sung, for that order is seldom twice the same. The phrases recorded in the first four or five columns are common ones that nearly all Wood Thrushes possess, though they differ somewhat in pitch. Those in the last three columns, that do not compare so well, are the ones that most easily serve to distinguish the individual.

The five-note phrase in column eight of the record for bird A is a most unusual one. In study of over sixty individual Wood Thrushes in the past three years I have nothing else like it. The

bird was first noted May 8, 1921, and sang with more or less regularity from then till June 29, when I could no longer keep track of it. It returned in 1922, being first noted May 17, and occupied a territory about a quarter of a mile from that occupied in 1921. In spite of this fact I feel sure of its identity, not only because of the five-note phrase, but all the other phrases, and the numerous terminations it used were identical in both years.

Bird B was best identified by the phrases in columns 7 and 8. That of column 7 is not an uncommon type of phrase, and that of column 8 is a type found in about one bird in ten in southern Connecticut, but I have not noted it in a study of birds in central New York. With bird B the combination of phrases rather than any single phrase identified it. The bird was first noted June 15, 1920, and sang with more or less regularity till July 18. It returned in 1921, being first noted on May 24, and occupied the same territory and exactly the same singing tree as in 1920. It returned again in 1922, being first noted May 29, but this time it moved its headquarters about 200 feet and sang from a new singing tree.

Birds C, D, and E were known only in 1921 and did not return. They were near neighbors of the other two birds, and often sang in alternation with them, though on no one day were all five birds singing together. Bird C was distinguished most easily by the fact that two of its phrases ended in notes that sounded flat to the ear trained to human intervals of music. Bird E possessed a phrase like that of bird B in column eight. Other facts, however, always distinguished it from B, particularly the lack of a phrase such as that in column 7.

One cannot rely on slight differences in the pitches of the phrases to distinguish individuals, for the phrases change slightly in pitch from day to day. When I first noted this I supposed my first records had been faulty in pitch, and consequently took them with greater care, but after a number of experiences with birds that changed the pitch of notes here and there, apparently overnight, I came to the conclusion that this was a common Wood Thrush characteristic. Exact pitches are not necessary to identify individuals, for it is the forms of the phrases and their relation to each other that are characteristic. One or two individuals I have studied have been identifiable by the fact that they possessed

only two or three phrases altogether, being as unusual in this respect as the bird that possesses nine is in the opposite.

Although I studied the songs of about fifteen individuals in 1920 and twenty-two more in 1921, I have obtained altogether only four returns, the two birds mentioned above, A and B, and two others. One of these others brought out an interesting fact. This bird sang in the area directly across the street from the Birdcraft Sanctuary of Fairfield, a spot well-known to many bird-lovers. The bird possessed one five-note phrase that was extremely beautiful and unusual. It also possessed a two-note termination which was as loud and musical in quality as the central phrases. Occasionally it sang its five-note phrase and added this two-note termination, making a series of seven clear, musical, flute-like notes in quick succession, a most beautiful and unusual performance. I studied this bird and its phrases quite thoroughly in 1921. On May 17, 1922, I heard this seven-note phrase again in the same locality. Having little time that morning, I merely noted the fact that the bird had returned, intending to make further studies of the song some other day for comparison with the records of the year before. I did not succeed, however, in hearing this bird again. Not long after, another individual took its place, singing a totally different set of phrases. Perhaps some tragedy had overtaken my seven-note bird, or perhaps the new individual being more vigorous in other respects if not so wonderful in song had driven it from its old headquarters.

Only one of my four returns of Wood Thrushes was a return to exactly the same headquarters. From the small percentage of Wood Thrush returns, I am inclined to think that this species, in southern Connecticut at least, is at its maximum abundance, and that there is keen competition for territories in the area available for its breeding. This would account for the small number of returns, and for the change of headquarters from year to year.

Like the Field Sparrow, the Wood Thrush shows the phenomenon of individual song period. The individual sings irregularly, being usually more or less silent in late May or early June for periods of two to five weeks. In two cases I have found nests which I believed belonged to certain males whose songs I knew. In one case the nest was found when the first egg had just been laid.

The male was in full song not far away that day, and continued in full song for two days more, that is, till the day the last egg was laid, then ceased. I did not hear it again till the young had been out of the nest at least two days and perhaps longer. In the other case a nest containing young was found about fifty feet from the singing tree of an individual I had studied earlier in the season. I had not heard it sing for some time. Two days after I found the nest some enemy, a Blue Jay, I think, destroyed the young. Two days after this my bird was in song again, but had changed its headquarters by a hundred and fifty feet. It sang in this new place for a few days and then was silent again. I did not find the second nest until November when the fall of leaves revealed it about thirty feet from the singing tree.

Less complete studies of the individual songs of other species have shown that the same general rules apply. Individuals of some species can be easily recognized. Those of others require considerable field work or are entirely unrecognizable. The Vesper Sparrow, for example, is rather like the Field Sparrow, save that the differences between songs of individuals is less marked. The Yellow-throated Vireo suggests the case of the Wood Thrush, but its phrases are less musical, more difficult to record with accuracy, and less distinctive. The Red-eyed Vireo, except in unusual individuals, seems to be almost impossible to work with, for each bird possesses twenty to thirty distinctly different phrases, yet these phrases are not easily distinguished from those of other individuals. The Maryland Yellowthroat seems to have a trick of singing one song for a few days, then changing to an entirely different one, so that one never feels quite sure of the individual from day to day, and not in the least sure from year to year.

In most respects this method of recognizing and tracing movements of individuals cannot compare with the method of bird banding. While I feel entirely certain of the accurate identification of the individuals whose returns I have mentioned, others will probably feel that it is more open to doubt than the return of a banded bird. Only males can be traced by this method, and only in the period of song. Only certain favorable species can be experimented with successfully. Returns from a totally different locality would be open to too much doubt to be of value.

Only those field ornithologists who have good musical ears and a good knowledge of music and the physics of sound could use the method.

On the other hand, there are those who object to bird banding on the ground that some bird may be injured thereby, who could not object to this method. Those who have not equipment or localities where they could band birds could use this method. Birds that are newly arrived in a locality would be heard in song the first day, but might not go into a trap immediately. Thus the date of arrival of breeding individuals could be definitely learned by the song more easily than by trapping. Peculiarities of habit and of song that would not be noted by trapping would be noted in using this method. Problems of the relation of song to nesting and to territory, the return of individuals to the same or different territories, and other related facts could be solved or partially solved by this method. A larger area could be studied and kept under observation than by trapping and banding. Species that have not yet been trapped, and that perhaps cannot be, might be studied by this method.

These are the disadvantages and advantages of this method as compared to bird banding. It is not, however, a question of whether one outweighs the other or not. Certain things can be accomplished by banding that could never be accomplished in any other way, and at the same time certain things could be accomplished by this method of study that are impossible by banding. The two methods are supplementary. Both should help us to learn new things about bird life. The field student who is equipped to do such work as this in bird song will find in it a wonderful opportunity to gain new ornithological knowledge.

48 Longview Ave.,
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A NUPTIAL SONG-FLIGHT OF THE
SHORT-EARED OWL.

BY A. DAWES DUBOIS.

A CALM evening on the Great Plains is remarkable in its possibilities for the transmission of sound. At my cabin in Teton County, Montana, it was nothing unusual, during intervals of calm, to hear the puffing of a locomotive on the railroad seven miles away. It was under such conditions, about 9:30 in the evening of the 31st of May, 1915, that I first heard the "tooting-song" of the Short-eared Owl (*Asio flammeus*). My field notes describe it thus: "'Toot-toot-toot-toot-toot'—etc., repeated fifteen to twenty times, at the rate of four toots per second, in a low-pitched monotone." It was dark at that time of day and of course impossible to trace the novel song to its source. The same sounds were heard again the next day but without leading to a solution.

On the 5th of June, while inside the cabin, I heard the tooting before dark (8:40 P.M.) and went outdoors to listen, and to follow it, if possible, to some conclusion. At first it seemed to proceed from the south-east but my movement in that direction brought me no nearer. It seemed then to come from all directions. Finally, upon gazing upward, I discovered the Owl directly overhead, and for a time was able to watch him, with the field-glass, in the fading light. He was flying at a great elevation; so great in fact that it was difficult to see him at all without the aid of the field-glass. For the most part his flight was with slow, silent flapping wings, although he sometimes soared. His course led in easy curves which kept him in the same general locality. His song, on this occasion, was made up of 16 to 18 toots. Now and then he made a short slanting dive which terminated with an upward swoop. The dive was accompanied by a peculiar fluttering noise; a sound of which I had been conscious for some time before I associated it with the Owl. It was such a sound as might be produced by a fluttering small bird imprisoned in a box; or by the flutter of a small flag in a very strong wind. Remembering that

sound travels more slowly than light, I believed that the fluttering ceased before the upward swoop began.

The 7th of June brought the coveted opportunity to watch the tooter in broad daylight. The sun shone upon him and enabled me to solve the mystery of the "fluttering flag." When the Owl began the short dive he brought his wings together beneath him, stretching them back posteriorly and striking them rapidly together with short clapping strokes. The dive ended simultaneously with the clapping, when the bird spread his wings, abruptly and noiselessly turning his course upward with a swoop. The clapping was clearly visible with the field-glass and the fluttering sound produced by it was distinctly audible. He seemed to be applauding his own aërial performance.

Having thus become familiar with the sound I often thereafter heard it, both in the daytime and after dark. Presumably such a song-flight is a ceremony peculiar to the breeding season. The next year I first heard the flight-song after dark on the 17th of March. Doubtless the birds had then just arrived at their breeding grounds, for I had not previously seen them there that year. Such records as are available for this locality, however, indicate that actual nesting does not begin until the middle of May or first of June. I have witnessed the high flight and heard the wing-clapping on the 23rd of June, when the Owl which executed these evolutions was known to have young in the field over which he was performing. On that occasion I had examined the brood of four young Owls (in a wheat field), and had seated myself perhaps a hundred yards away to watch the maneuvers of their parents. One parent disappeared as soon as I left the young and was probably on the ground with them but the other flew and soared in circles above me, gradually climbing until he was at a great height. During the time that I watched, he twice indulged in wing-clapping. Having thus spiraled upward above me to his maximum height, he shifted his center of flight to a point more nearly over the nest, at the same time reducing his elevation.

During four years of observation, March 17 was the earliest and August 28 the latest of my records of occurrence of the Short-eared Owl at this place. The birds were not present in the winter.

It may not be amiss to append to these observations a review of

all other vocal sounds which I have heard produced by this species in the same locality. The list divides itself naturally into two groups. The first group, which, for want of a better term, may be designated as "nurture signals," includes only the sounds uttered by the parent while on her nest, during the nurture of young. These signals were observed from a tent-blind close to the nest, while the parent was caring for fosterlings, the items being abstracted from a narrative account previously published.¹ It should be mentioned in connection with those observations that the Owl uttered no vocal sounds at the nest during the period of incubation.

The second group, herein designated as "cries of remonstrance," refers to the cries used by the adults when their young were threatened or approached by an intruder. The data for this second group represent observations at or near three nests.

NURTURE SIGNALS.

(1) A low "cuk" somewhat similar to the cluck of a hen; this was a call note or a note of reassurance to silence the chicks when they cried.

(2) A rapid series of "cuks," merging into something like the alarm signal of a domestic hen and continuing to increase in pitch and frequency to a termination of very high-pitched, rapidly uttered notes.

(3) A sudden alarm note, uttered as a warning to young (chicks) to keep quiet, when danger seemed to threaten from the air above them.

(4) A very high-pitched note; in reality a series of squeaks which accompanied the rubbing of chicks' backs with bill or fondling them against face. Seemingly an invitation to take food and an expression of affection.

(5) A hiss, or soughing sound, produced by expulsion of air through the open bill (not by vocal chords). An expression of displeasure, admonition, or defiance.

¹ 'The Short-eared Owl as a Foster-Mother,' by A. D. DuBois, 'Auk', July, 1923.

CRIES OF REMONSTRANCE.

(1) Barking notes, uttered while flying over or around the intruder; the repetition several times in succession of a single syllable.

(2) A sort of purring growl which suggests the syllables: "ma-yow," or "keyow," sometimes drawn out to "ka-a-yow," with an impressive accent on the last syllable. It is uttered either from the air or from the ground. These cries have a rather ferocious sound.

(3) A prolonged, very high-pitched squealing cry (a sham cry of distress), uttered while on the ground, either standing or floundering in simulation of injury and helplessness.

The young of the Short-eared Owl also are capable of vocal expression. The four Owlets previously mentioned (June 23) were in various stages of development, the oldest being quite large and covered with thick wooly down, while the youngest, with its eyes not fully opened, was apparently not many days out of the shell. The older brothers were silent but the "baby" of the family uttered a little cry which sounded remarkably like the distant "peenk" of a Nighthawk.

327 South Glenwood Ave., Springfield, Ill.

A STUDY OF THE HOME LIFE OF THE NORTHERN
PARULA AND OTHER WARBLERS AT HATLEY,
STANSTEAD COUNTY, QUEBEC, 1921-1922.

BY HENRY MOUSLEY.

Plates XIX-XX.

In the opening pages of his monograph on 'The Warblers of North America,' Dr. Chapman points out that they have been described as "our most beautiful, most abundant, and least known birds." The above work was published in 1907, and so far as I know the description holds good today, for I believe it would be difficult at the present moment to find a really intimate study of the home life of any Warbler. This is not to be wondered at, for

the simple reason that few persons are inclined to spend the time and undergo the discomforts and disappointments attendant thereon. It would not be so bad or discouraging, if a single study of any one species could be "the be-all and the end-all" of the matter, instead of perhaps at least half a dozen, i.e. if one wishes to gain an adequate idea of the average home life of each species. No one, except those who have engaged in the work, knows what a strain it is on the nerves to sit for hours at a time, day after day, watching and recording the minutest happenings at a nest. There is no half and half business about it, for any laxity on the part of the observer, may result in some important detail being missed, and so one must be prepared to endure excessive heat, and the tormenting of mosquitos and black flies, whilst never taking one's eyes off the nest for a moment. Even after this, one may only be partially rewarded, as something unforeseen may happen to the young before the final study is complete, which is more than likely. No two pairs of birds act exactly alike, and therefore it requires several studies before one can form an accurate idea of their behaviour. In some cases, it is the male that shows the greatest boldness when humans intrude, in others, it is the female, and yet again, both may be equally bold or nervous. In the first case of the Black-throated Blue Warbler (*Dendroica caerulescens caerulescens*), as I shall presently show, the male took no part whatever in feeding the young, and had no further study been made, it might have been taken for granted that this was always the case. The present studies were begun in 1921, and from the first it became evident, if true pictures were to be obtained, there must be as little interference with the young as possible. Any approach to these, or the nest, usually resulted in the upsetting of the normal behaviour of the parents, and for this reason, it was thought best to do very little with regard to describing any changes in the nestling plumage. In some cases, it was difficult enough even with the greatest care, to overcome the natural nervousness of one or other parent, and induce them to keep on feeding their young normally. No one knows better than the author that the results, in some cases, were not always quite what they might have been, had no one been present. With the foregoing remarks, I shall now proceed with the more detailed account

of the five Warblers embraced in this paper, which, in addition to the Northern Parula Warbler (*Compsothlypis americana usneæ*), consist of the following, viz.: Black-throated Blue Warbler (*Dendroica cærulescens cærulescens*), Chestnut-sided Warbler (*Dendroica pensylvanica*), Magnolia Warbler (*Dendroica magnolia*), and Redstart (*Setophaga ruticilla*). It was on June 13, 1921, whilst en route to a favorite Warbler wood, that I heard the unmistakable notes of a male Northern Parula Warbler (*Compsothlypis americana usneæ*), proceeding from the top of a birch tree in the center of a small swampy wood. What more natural than the desire to once again test out my "Singing Tree," and Mr. Eliot Howard's "Headquarters" theory, and so it came to pass, that the song with its "explosive little buzz," eventually gave away the nesting site, and finally led to a tragedy. The nest was situated in the lowest branch of a very tall spruce (*Picea canadensis*), three feet six inches from the trunk, and twenty-six feet above the ground, and twenty yards away from the favorite (there were others) singing tree of the male, the birch. It was indeed a beautiful creation as will be seen from the accompanying photograph, and differed from any of those previously found here, being suspended after the manner of a Baltimore Oriole's (*Icterus galbula*), and I should imagine very, if not exactly, like the one described by the late Wm. Brewster in his 'Birds of the Cambridge Region,' 1906, pp. 328-329. It was composed entirely of usnea lichen (*Usnea longissima*), the only foreign material being a few cherry stalks, which may have been intended for a lining, but as a matter of fact, were all at one side, and upright, and seemed better adapted for strengthening, rather than lining the nest. The dimensions were as follows, viz.: outside diameter 3, inside $1\frac{1}{2}$ inches; outside depth $2\frac{1}{4}$, inside $1\frac{1}{2}$ inches. It was discovered about three o'clock in the afternoon, by scanning all the likely looking trees within the magic circle (i.e. 20 yards from the birch tree), see "The Singing Tree," 'Auk,' Vol. XXXVI, 1919, No. 3, p. 341, but it was not until four o'clock that the male was seen chasing the female. Soon after, a thunderstorm came on, and I was obliged to leave the site before ascertaining what was in the nest. This I found out the following afternoon, for just as I arrived at three o'clock, I saw the male go to the nest with a green larva in his mouth and feed the

young, and a minute later, the female went on the nest and remained brooding. I feel sure the young hatched out in the morning, for on the previous day (June 13), I had not seen anything of the female whilst looking for the nest in the morning, nor did the male ever approach the exact site of the tall spruce, which by the way was five yards from a logging road. After ascertaining that there were young in the nest, I went in search of other matters that were claiming my attention, and did not return until 5:15 p.m., when I took up a post of observation twelve feet away from the nesting tree. This meant that I was looking up, at an angle of about 70° , at the nest 29 feet above me. As can be imagined, this was a most trying position, but it could not be avoided, as the location and construction of the nest, as well as the denseness of the surrounding vegetation, made it absolutely necessary that I should be as near it as possible, if I wished to see all that was going on. Even then, some points were not always clear to me, as I shall mention later on. It would become tedious and take up too much space, if I was to relate in detail everything that took place at the various nests, so I have prepared a table giving a summary of the principal events. There are, however, certain points in each case, which seem to call for special mention, and these I shall deal with as they present themselves. Referring to the Northern Parula Warbler (*Compothlypis americana usneæ*), as already mentioned above, the first period of watching commenced at 5:15 p.m. on June 14, and lasted for an hour only, as it commenced to rain. During that period, whenever the male arrived with food, which always consisted of soft green larvæ, the female invariably left the nest, with the exception of once, when he gave her the food, which she doubtless passed on to the young, but I could not be sure of this, as she was scarcely visible while brooding. On the following day, a very pretty incident took place. The female had left the nest at five minutes to nine, and at nine o'clock the male arrived with food. This he was distributing amongst the young, when the female suddenly appeared, and perched on a twig close beside him, but brought no food. Thereupon, he fed her also, and when he left, she went on the nest and brooded, always sitting with her head facing in one particular direction. This same incident in every detail was repeated at 10:55 a.m.

At 9:57 and again at 10:42 a.m. (also at 1:06 p.m. on the 16th, and 6:01 a.m. on the 17th) the male after feeding the young, sang in the nesting tree! This is a most unusual proceeding, in fact I have never seen it enacted before or since, in any species of Warbler. The males in my experience (I am only referring to Warblers of course), never give the nesting site away, by singing directly from the tree in which the nest is placed. Certainly, on two occasions, I have seen bereaved males (in one case it happened to be a Northern Parula Warbler, and in the other a Chestnut-sided Warbler), after singing for a day or two from their favorite tree, at last fly through the nesting tree, in a last endeavor as it were to find out the reason for the non-appearance of their mates, both of which had come to an untimely end by some manner of means. As a fitting climax to this most interesting period of watching, the male arrived at 12:10 p.m. with food, upon which as usual the female at once left the nest. After feeding the young, he proceeded to brood them, and continued doing so until 12:14, when the female returned, and took his place. This again is a most unusual thing for the males to do in my experience. Of the ninety-five hours of intensive watching of the five species embraced in this paper, I never once saw the act repeated. Of course I am aware the fact is not unique, as the male of the Chestnut-sided Warbler has been known to brood the young, but he did not do so in my case. This only shows how necessary it is (as I have already remarked), that we should have several intensive studies of each species, to enable us to form, at least, a better conception of the behavior of this sex, as regards incubating, feeding, and brooding the young, matters concerning which that of the female is pretty well known. During the afternoon session of this same day, i.e. June 15, nothing particular occurred, except that at 4:18 both parents arrived at the nest together, and this same thing happened again at 5:47 a.m. and 7:02 p.m. on the seventeenth. In cases of this kind, where circumstances allow of it, the parents stand side by side on the edge of the nest, and feed the young together. Here this was impossible, owing to the construction of the nest, so in each case the male fed first. But why should the male have fed the young first on each occasion, instead of the female? Simply because I imagine, her instinctive behavior of

brooding, bred in through the ages (which is a very different thing to the human reasoning powers which some people are so fond of ascribing to birds), told her (if I may use such a word in this connection, perhaps directed her would be better) to remain until last, so that she might brood her young after the male had left, which she did on each occasion. On the seventeenth, I spent nearly six hours with these birds, three in the early morning and two and three quarters late in the evening, and this was my undoing, for I began to realize that intensely interested as I was, it would be impossible to last out the strain much longer, of watching the nest in its present position, and something would have to be done to relieve the situation. However, before relating the tragedy these ruminations eventually brought about, I will record a few points of interest that were forcibly brought home to me, not only during these early and late hours of watching, on the above day, but also at other times as well.

In the first place, it was noticed that the food the male brought consisted almost invariably of soft green larvæ, whereas, that of the female more often than not consisted of insects, and the portions she brought were usually smaller in proportion than those of her partner. The latter, as a rule, never announced his approach to the nest by a sound of any kind, whereas the female always did so, by uttering a sharp "chip," which no doubt warned the young of her coming. The male, however, on several occasions when his mouth was full of food (this fact I know is almost unbelievable to some persons), gave vent to a short song, no doubt intended as a warning to his mate of his approach, for I noticed she became on the alert immediately she heard it, and was always ready to leave the nest. So far as I was able to judge, the male never removed the excreta or faeces voided by the young. As regards the female's behaviour in this matter, I am not positive as it was impossible to see exactly what took place in the nest, when she was in it, for, as I have already remarked, she was hardly visible. I have six or more entries in my note book, however, indicating that she was engaged in actions which I knew from experience, were those of a bird engaged in cleaning operations, but on none of these, or at any other time, was she seen to leave the nest with the faeces in her mouth. They were undoubtedly eaten, which is generally



Photo. Geol. Survey, Ottawa

NEST OF NORTHERN PARULA WARBLER (*Compsothlypis americana usneæ*),
HATLEY, QUEBEC, JUNE 13, 1921.



the case during the early stages of brooding, especially by the female. This habit of removing the fæces I feel sure is an instinctive or congenital one, bred in through the aeons of ages, whilst that of eating them, especially in the case of the female, is acquired, and brought about no doubt by the pangs of hunger whilst brooding. In the case of the male, it may be a question of hunger at the moment, or more likely a saving of labor in transporting the fæces some distance from the nest. It is a fallacy to imagine that the parents, after feeding the young, always wait and look for the fæces to be voided, although they usually do so, and even in some cases administer a sharp tap to the anus of the young when it fails to respond, this generally having the desired effect. Unquestionably to my mind this further procedure is congenital and not acquired.

On the sixteenth, although the sun shone brilliantly, there was a cool wind, and the male sang very little, but on the other dates he did so constantly, from certain favorite trees (as well as from the nesting tree itself as already recorded) in the neighborhood of the nest, and on the last day, i.e. the 17th, I heard him as late at 6:50 in the evening. This singing of the males of the American Warblers after the securing of a mate, and during the incubating, brooding, and feeding periods, is an interesting and important point. In my experience, they sing almost as loudly and constantly, after, as before, the securing of a mate, but Mr. Eliot Howard in his 'British Warblers,' 1907-1914, speaks in many places of there being a great falling off in the vocal performances of the males, not only after they have secured a partner, but also during the incubation and brooding periods. Of the twenty-six species included in his work, all with the exception of the Dartford Warbler (*Melizophilus undatus dartfordiensis*) are migratory, eleven only remaining to breed, with which eleven it has been my good fortune to be somewhat intimately acquainted, having found the nests and eggs of most of them. Of the Dartford Warbler, Mr. Howard was at that time unable to say anything definite, but of the other eleven species, with the exception of the Chiff-chaff (*Phylloscopus collybita*), which sings almost continuously even after the young have left the nest, we find constant references to the diminution or cessation of the song altogether, during the periods above mentioned.

Contrast this with my account of the singing of the male Blackburnian Warbler (*Dendroica fusca*), during the building of the nest by the female, or that of the Bay-breasted Warbler (*Dendroica castanea*), during the incubating by the female, see "The Singing Tree," ('Auk,' Vol. XXXVI, 1919, pp. 339-348), or yet again, that of the Nashville Warbler (*Vermivora rubricapilla rubricapilla*), during the construction of the nest and afterwards, ('The Auk,' Vol. XXXV, 1918, p. 302), and many other references to this same subject, too numerous to mention here. Of course there are exceptions to every rule, but it certainly looks from the general weight of evidence gathered by Mr. Howard and myself, and doubtless by others as well, as if there was a marked difference in the singing proclivities of the males of the Old World Warblers (Family Sylviidæ), and those of the American or Wood Warblers (Family Mniotiltidæ). And now for the tragedy of the nineteenth, brought about by the desire of a friend to photograph the nest and young, and my growing anxiety to have the same at a more comfortable angle for observation. We therefore decided to saw off the whole branch, and lower it and the nest, to within about six feet of the ground. Now, my friend knows that, although agreeing to the arrangement, I expressed my doubts at the time as to its ultimate success. Accustomed as I have been all my life to experiment with birds, and in most cases with success, an example of which I shall give later on, I have always selected what I considered the exact psychological moment for the experiment, i.e. when everything was attuned to what one might call concert pitch. In the present instance, it seemed to me that these conditions were decidedly wanting. To begin with, I was quite ignorant of the possible strength of the parental instinct in this species under abnormal conditions. The young (of which there were three) were only five days old, and had barely begun to make their voices heard, and for this very reason, if no other, it seemed inadvisable to make the change at this stage of their existence. Had they been older, their clamoring for food, combined with the fact that the parental instinct, incident to this particular term of the reproductive cycle, would have been reaching its maximum, and I feel sure the parents would never have deserted their young as they did. Needless to say I was greatly grieved and disappointed,

but the best of us commit errors at times. From errors we learn wisdom, and this failure I hope will cause those who pin their faith on the human reasoning of birds, to study more fully the subject. There was no earthly reason why the parents should have deserted their young. The branch with the nest and young was always in full view of them, and had they remained in the neighboring trees, and used their supposed reasoning powers, they would have returned to the nest directly we had retired out of sight. But this was not so, and although I visited the spot several times again that day, it was all in vain, they never returned. A link in the chain of the reproductive cycle had been broken, and at a point where it could not be repaired. A new nest must be constructed, a fresh set of eggs laid, another incubation period undertaken, and then once again, a brood of young would appear, if nothing unforeseen occurred. And so it is always, unless the break or alteration in the normal conditions of any particular cycle, occurs at a time when it can be bridged over. This can only be, when nature is attuned to withstand any temporary disruption of its natural functioning, which it evidently was not in the present case. The parental instinct had not had sufficient time to get worked up to that pitch, (and the young were not old enough to play their part, by vociferous clamoring for food, which all helps in the natural order of things, to the attainment of the above state), when little short of an earthquake, so to speak, would have prevented the parents from sticking to their young, in spite of the altered condition of things. Nervous temperament of course plays its part, all birds not being alike in this respect, but the love of the young, especially by the mother, usually overcomes any sense of fear evoked by alterations in the original site or surroundings of the home. The young at this date had a line of darkish feathers just showing down the center of the back, rest of back and sides bare, also center of belly and underparts, except for a strip of whitish or yellowish feathers on either side, extending from the throat to the rump. Head covered with darkish down, eyes open but not fully so. Pin feathers of wings and tail just showing.

The next nest to come under my observation was that of a Black-throated Blue Warbler (*Dendroica caerulescens caerulescens*), which I discovered on June 20, 1921, in a patch of American

yew (*Taxus canadensis*), a very favorite nesting site for this species. I was passing this patch when I noticed the female hovering about with food in her mouth, so I sat down on an adjacent stump and awaited results. It took some little time before she at last ventured to approach and feed the young, and no wonder, for I was sitting only sixteen feet away from the nest, which was resting on a drooping yew branch, and was only ten inches above the ground, and contained four nearly fledged young. It was late in the afternoon when the discovery was made, so I decided to postpone the first period of watching until the following day. Arriving at 5:30 in the morning, I heard the male singing not far off, and seven minutes later the female arrived and fed the young with a soft green larva and insects. Twelve minutes later, she again fed them with the male in attendance, and this occasion, and two others, on one of which he brought food, but did not feed the young, are the only ones on which the male approached the nest during this first period of five hours' watching. I often heard him singing in the distance, however, very softly and lazily, and once he drove off a male Chestnut-sided Warbler which alighted in a tree near the nest. The female on the contrary was very busy, feeding the young no less than 123 times, usually with insects, but also at times with soft green larvæ. Once she fed a daddy-long-legs (*Tipula oleracea*), and it was a most amusing sight to see the maneuvering that had to be gone through, to get the long legs packed away into the throat of the young one. Quite good sized moths were also occasionally brought. She removed the faeces ten times, always carrying them away in her bill to a nearby tree, and dropping them often cleaning her bill by rubbing it backwards and forwards on the branch. So tame did she become, that I had her collecting food all around me, and on several occasions I could have touched her by either extending my leg, or stretching out my arm. During the second period of watching in the afternoon, the male twice accompanied his partner to the nest, but brought no food. Once again he, however, chased off the male Chestnut-sided Warbler, and sang constantly both near, and at some distance from, the nest. The female behaved as in the morning, feeding the young 56 times, or at the rate of about once every two minutes! They were now chipping lustily, and the female also kept up a

constant chipping, whilst searching for food, and when approaching the nest. At the third sitting in the evening, events at the nest went on much as before, the male singing for the last time, just before nine o'clock, as the female was feeding the young, also for the last time. The following day, June 22, was the last I was to spend with this pair of birds, but the five and one-half hours that I was at the nest will never be forgotten. Now it is the usual practice of Warblers, and for most birds I think, to approach and leave their nests almost always by some well defined route, i. e. on arrival they usually land on some particular branch of a tree or shrub, and from there perhaps pass to another nearer the nest, and then to the nest itself, never in the first instance flying direct to the nest. On leaving, however, they usually fly off in one particular direction, the female sometimes in a different one to that of the male. Having learnt by now the almost invariable procedure of this particular female on leaving her nest, I decided to fasten a small piece of crumpled up white paper to a little twig directly in her line of exit, and see what she would do. The first time, she tried to remove it, but failing in this, she flew off. The next time she perched close to it, but did not try to remove it, and for the future took no further notice of it. Evidently, in the first instance, she mistook this small ball of paper for a white faecal sac, which her instinctive behavior would lead her to remove. The young were now moving about in the nest and chipping loudly every time they saw the female arriving with food, and I began to realize that it would not be long before they would leave their home for good.

At one o'clock, the male arrived with food in his mouth, and a minute later, went to the nest at the same moment as the female did. Thereupon, some kind of scuffling took place, and in the mêlée I was unable to make out exactly whether the male fed the young or not. At all events, he went off with his partner, and as he had no food in his mouth, I am giving him the credit of having fed his offspring, for the first and only time. Five minutes later, he returned with his mate, and waited whilst she fed the young, and then went off with her again. A minute later, the same thing was repeated, except that the male on this occasion indulged in a little singing. The heat was very oppressive by now (84°), and

the young were beginning to feel it, and at twenty minutes past two, the first one left the nest, and flew into a small fir tree two yards away. Soon after, the female arrived and fed it, and did so again, four minutes later. Then she turned her attention to the three remaining young in the nest, and fed them five times in succession, before she again attended to the one in the fir. At seventeen minutes past three, two more young left the nest, and thirty-six minutes later, the last one also took his or her departure, being just a little over one hour and a half after the first one. During all this time, the male never put in an appearance excepting once, when he chased a male Black and White Warbler (*Mniotilta varia*) away. When at last he did appear, the young were scattered about all over the place, one of them being 28 yards away from the nest. His astonishment seemed great, as he flitted from tree to tree, but he did nothing whatever towards helping his mate feed and keep the young together. By staying longer, I felt I was only making matters worse for this hard-working little mother, as by moving about trying to keep track of the young, I only frightened them still further away, so at four o'clock I decided to withdraw. During this last period of five and one-half hours watching, the female had fed the young 138 times, to her partner's once, or a total of 349 times, for the whole period of fourteen hours, or once every 2.4 minutes! She has been described by a newspaper reporter, as "the busiest mother in the world!" and not without good reason I think. As I departed, the thought uppermost in my mind, was that I had witnessed the case of a young male mated to an older, and more experienced female, and this was strengthened by the subsequent behavior of the male, in the following case which next came under my notice.

The nest in this instance was the third one in succession from the same pair of birds, and was in the same wood as the one just described. The first nest I discovered on May 27, 1921, built in the forks of a small fly honeysuckle bush (*Lonicera canadensis*), one foot above the ground. When found, it was quite finished, but the first egg (which I never saw), must have been taken by a squirrel, I think, as the birds deserted it. They then moved 75 yards away, and constructed another on the drooping branch of a balsam fir (*Abies balsamea*), ten inches above the ground, and two

feet eight inches from the trunk, and which contained four eggs when I found it on June 9. These I took, as I was anxious to obtain some further data relative to my paper on "Subsequent Nestings," ('Auk,' Vol. XXXIV, 1917, pp. 381-393). The birds then started their third venture (which I promised them not to molest) forty-four yards from the present site, the nest being placed in the forks of a small fly honeysuckle bush (the same as the first one was), eighteen inches above the ground. Three eggs were laid, and on July 5 two young hatched out, the third egg proving later on to be addled. On approaching the nest, the female dropped to the ground, and acted the well known broken-wing trick (inherited), trailing it along the ground in an endeavor to divert my attention to her, and lead me away from the nest. I selected the most convenient place for observation, and sat down twenty feet from the nest. I remained only a quarter of an hour, but returned again at 3:30 p.m. and stayed until 5:30. During these two hours, the male put in very little time at the nest, and never once attempted to feed the young, although the female did so nine times. I heard him singing, however, on several occasions, but generally at some distance from the nest. On the following day, he broke my existing records, by feeding the young three times to his partner's twelve. This, however, seemed to be too much for him, as on the following day he had a serious relapse, and never fed his offspring once, whereas his partner did fifteen times, and brooded almost as many. The heat was terrific, the thermometer at 1 p.m. registering 92°, with a great deal of humidity, which increased one's discomfort, to say nothing of mosquito bites. The female was visibly affected, often standing up in the nest, with her mouth wide open, panting for breath, whilst with outspread wings, she shielded the young from the sun's rays. The male, although not troubling himself in the least with home affairs, did the usual amount of singing, both near to, and at some distance from, the nest. The following day (the 8th) the heat was as great as ever, but a change had come over the male, for he fed the young nine times to his partner's seven. On the 9th, his average was in excess of that of the female. On one occasion, they both arrived at the nest together, and it was a pretty sight to see them perched side by side, each feeding a young one. It was during this same

period of watching that I was fortunate in witnessing two rather remarkable episodes. At a minute past two o'clock the female left the nest, and did not return until two forty-five, being absent forty-four minutes, during which time the male fed the young twice. Again, at three thirty, after feeding the young, the female went off with the male (he had been flitting about near the nest), and did not return until four fifty-eight, after an absence of one hour and twenty-eight minutes! During the whole of this time, the male did not feed the young at all. In view of the previous long absence of the female, I was doubly on my guard this time, and never, for a moment, took my eyes off the nest. Let any one try this, and they will soon realize the truth of my statement, regarding the strain on one's nerves that bird watching entails. On this date also, the male was seen for the first time to clean the nest by carrying away the fæces in his mouth, and the female did likewise. She had been seen to do this once previously, on the seventh. How many times she ate the fæces it is impossible to say, as one cannot be sure of this, when a bird has its head hidden in the nest, whilst rooting about, not only for the fæces, but also for any lice there may be as well, both of which I believe are invariably eaten by the female in the early stages of the home life when brooding is the order of the day. I was unable to visit them on the 10th, and when I arrived at 2 o'clock the following day, both young had gone, taken no doubt by some rascally squirrels that I had seen and frightened away on several occasions, during my previous periods of watching. I ought by rights to have shot them, as they are far too numerous, and on other occasions have been the means of spoiling no end of my studies, just at the time when some particular data were most needed, as in the present case, that of the age when the young leave the nest, which I was unable to fix definitely in the previous study.

The next nest to come under my notice, was that of a Chestnut-sided Warbler (*Dendroica pensylvanica*), and this has quite a little history attached to it. In the first place, the male of the pair to which it belonged, was the one the male Black-throated Blue Warbler chased away on two occasions on June 21, and he it was also, that flew through the nesting tree, in a last endeavor as it were to trace the whereabouts of his lost mate, both of which



Photo. Geol. Survey, Ottawa

NEST OF MAGNOLIA WARBLER (*Dendroica magnolia*), HATLEY, QUEBEC,
JUNE 16, 1922.



incidents I have already alluded to. Round this former nest (which was one of the very few in which fir twigs were used in the construction, and on which his partner had only worked for two days before coming to her untimely end), the male had sung for several days, before finally deserting it. At last he moved away, but I found him singing again in another tree, about eighty yards from the former site. A few days later he secured another mate, and I located their nest (the present one) on June 20, 1921, just seventeen yards from the new singing tree, and twenty-five yards from the nest of the first pair of Black-throated Blue Warblers found on this same date. It was situated in a raspberry cane, two feet eight inches above the ground, and when found was only partly constructed, the female being in it at the time. On June 25 it contained a set of four very beautiful heavily zoned eggs, and incubation had just commenced. The first young hatched out sometime between 10 a.m. and 6 p.m. on July 5, and at 9 a.m. the next morning there was another, the third appearing later on in the day, the fourth egg was addled. I took up a station twenty-two feet from the nest, and commenced my first period of watching at 8:50 on the morning of July 6. Nothing particular took place, the female as is usual in the early stages doing a good deal of brooding, nearly always sitting in the nest facing in one particular direction, the same as the Parula and Black-throated Blue Warbler did, whilst the male sang in nearby trees, and did most of the feeding. The young were naked and blind, except for a little down on the tops of their heads, which was also the case with the young of the last mentioned pair of Black-throated Blue Warblers when they hatched out. The following afternoon the heat was very great (80°), and both parents seemed to be affected by it, the female at times brooding the young, by standing over them with outspread wings, and mouth wide open. On one occasion, the male drove off a male Black-throated Blue Warbler which had approached the nest too closely, and again later on, did the same thing to a female of the same species, no doubt the parents of the brood which left their nest on June 22, which nest it will be remembered, had only been twenty-five yards away. And so it came about, that the Black-throated Blue Warbler had the same cold reception meted out to him, as he had extended to the Chestnut-sided Warbler,

when the latter visited his preserves on June 21. Nothing of particular interest occurred on the 8th, and on the 9th, I was unable to visit them. The following day, soon after I arrived, or at 10:25 a.m. to be precise, the male and female appeared at the nest together, the former with food only. Part of this he fed to the young, and the rest he gave to his partner, who ate it, and then brooded the young. Twenty minutes later, the male, after feeding the young, removed the fæces for the first time, carrying them away in his mouth, and dropping them from the branch of a nearby tree. It had become noticeable by now, that he always left the nest differently to the female, flying in my direction, whereas she went off sideways. They both, however, approached it in the same way, from below. At 11:40, both parents again arrived at the nest together, and this time they both brought food, which they distributed to the young, they themselves standing side by side on the edge of the nest. The male fed a very large soft green larva, and his partner a large moth, both of which morsels caused the young many contortions, before they could get rid of them. From this date the male did the bulk of the feeding, and carried away the fæces thirteen times; the female once. She had been assiduous up to then in this, as well as in ridding the nest of pests, all of which, however, had apparently been eaten, as seems to be the universal custom. On the 11th, the eyes of the first two young were about half open, that of the third about a quarter so. The food on this day seemed to consist of very large soft green larvæ, which at times it seemed almost impossible the young could swallow, in fact, on some occasions when difficulty arose, they were withdrawn by the parents, and re-arranged. On the 12th, I was unable to visit them, but on the following day, the eyes of the first two were wide open, and those of the third about three quarters so, the feathering and wing bars being well advanced. At 10:17 a.m., the male chased away a male Canada Warbler (*Wilsonia canadensis*), and at 11:40 the young began to be very lively, continually preening their feathers, and moving about in the nest. In the afternoon it became very hot, and the young suffered in consequence, continually opening their mouths and panting for breath. Once in the morning, the male dropped the fæces half-way between the nest and my seat, but although so near me (only

eleven feet off), he returned and picked them up off the ground, and flew away with them, a good instance of the strength of this instinctive habit. I was obliged to leave the site at 3:30 p.m. which was unfortunate, as I felt sure it would not be long before the young would leave the nest, as they were getting extremely restless, accentuated no doubt by the great heat. When I arrived the next morning at ten o'clock, they had all gone having left the nest either early that morning, or late the previous afternoon when they would be eight days old.

By this time, what with all my other activities in the orchid, fern, and butterfly line, I had had about enough of bird watching, and had almost decided to give it up for good. Resolutions of this kind are very easy to formulate, but precious hard to keep, and the capture of a new butterfly, or the finding of some rare fern or orchid, is apt to bring on an attack of the old fever at any moment, and so it was, that a year later, or on June 19, 1922, the finding of a nest of the Magnolia Warbler (*Dendroica magnolia*) which seemed to offer fresh "possibilities," set me off on the war-path once more. The nest in question was situated in a small fir tree, four feet above the ground, and close to the trunk and at the time contained four young birds, which I took to be seven days old. Their eyes were fully open, and the nestling plumage well advanced. From the very commencement, I saw a new field of experience would be opened up, owing to the shyness of the female. Hitherto, all the birds had exhibited very little fear at my presence so near their nests, and what they had, they soon mastered, owing to my knowing how to keep perfectly still, one of the most important things in bird watching, and one to which the novice hardly ever pays any attention. In the present case, I found the nest at noon, but did not commence the first period of watching until 1:30 p.m., sitting twenty-four feet away from the nest, but in full view of it, as all obstructions had been cleared away, the same as had been done in the previous cases. The female was very nervous, but the male was just the opposite, taking no notice of me whatever, and as in the case of the male Chestnut-sided Warbler, always flying in my direction when leaving the nest. He fed the young eleven times to his partner's four, and removed the faeces seven times to her once, always carrying them away in his mouth, and dropping

them from the bough of a tree. It was very close and muggy, and the male did not sing at all, but he made up for this the following day (the 20th) by singing constantly from nearby trees, both in the morning and afternoon. He removed the faeces eight times, dropping the little white sac on one occasion near the nest, but like the Chestnut-sided Warbler, he at once returned, and picked it up off the ground, and carried it away. Twice he sang with food in his mouth, the same as the Northern Parula Warbler did. After my arrival at 9 a.m., it was three quarters of an hour before the female summoned up courage enough to feed the young, although the male had already done so five times. Once they arrived together, both bringing food, which they gave to the young in turn, they themselves standing side by side on the edge of the nest. In the afternoon, the nervousness of the female increased if anything, and on three occasions she actually remained underneath the nest, with the food in her mouth, once for thirty-seven minutes, and it was only on the arrival of the male, that she ventured up with him and fed the young, both standing together on the edge of the nest as before. They both approached it from below, the same as the Chestnut-sided Warblers did, and like them, also, left it in different directions, the male flying directly towards me as already mentioned, and the female going off sideways. I was unable to visit them on the 21st, and when I arrived the following afternoon, the young were all gone, having left the nest either in the morning or on the previous day, when they would be eight days old, as this was the age of those in the following case when they left their nest. This was a very interesting study, for the nest, as will be seen in the photograph, was somewhat unique (although I had found a similar one a few days before), being built in the forks of a spiræa bush (*Spiræa salicifolia*). I suppose I must have found some dozens of nests of this species, but never in anything but coniferous trees, this being the usual site, not only here, but elsewhere. However, there is a reference curiously enough to a nest having been found by the Rev. C. J. Young, on July 1, 1895, built in a spiræa bush among small pines and hemlocks, near Otly Lake, Lanark Co., Ontario, see 'Catalogue of Canadian Birds,' Macoun, 1909, p. 637.

The present one was found on June 16, two feet six inches above

the ground, and contained four heavily incubated eggs, three of which hatched out four days later, two at 11:30 a.m., and the third a few hours afterwards, the fourth one being added. Previous to this, I had made up my mind to collect this nest, as it was an unusual one, and substitute another in its place, but to have done so when the female was incubating would no doubt have lost me the opportunity of recording the home life of this pair of birds, as she would most probably have deserted it. I therefore provided myself with an old nest of the species, and waited until this particular period of the reproductive cycle had reached its maximum, i.e. immediately the young were born, and the fulfilment of the instinctive habit of incubating had been attained. This occurred as I have already mentioned on June 20, at 11:30 a.m., about which time, whilst the female was away seeking food, I quickly cut off the branch with the forks containing the nest and placed the old one in some adjacent forks of the same bush, but somewhat lower down, and to one side, and took up my seat of observation twenty-four feet away, the same distance as in the previous study. In less than five minutes, the female returned, and both fed and brooded her young, just as if nothing had happened. This was the other experiment I referred to, when dealing with the case of the Northern Parula Warbler, and it worked out all right, because it had been carried out just at the right psychological moment. After this experiment I thought it best to keep away for a time, so did not return until the following morning at 8:30. During this period of watching, the male did not feed the young at all, but he sang constantly from nearby trees until about ten o'clock, when it commenced to rain, with indications of a thunderstorm coming on. I was glad of this, for the weather was very oppressive, and I had made up my mind to stay through it all, and see how the female would behave during the heavy rain, which was beginning to come down in torrents. The young at this time were of course blind, and nearly naked, with the exception of a little down on the tops of their heads, wings, and along the center of their backs, and those believing in the human instinct and reasoning power of birds, would naturally conclude that the female would brood and never leave them for an instant, for fear of their getting soaked with the rain. Nothing of the kind, for what did she know of

thunderstorms, or any other unforeseen circumstances, her instinctive behavior of feeding her young at certain intervals alone guiding and directing her, so that she left the nest several times during the very height of the storm, when the rain was literally coming down in the proverbial buckets full, and I was drenched to the skin, notwithstanding that I had on a light mackintosh. At eleven o'clock the storm was beginning to abate, so I made for home, leaving the female on the nest brooding her young.

On the following day, neither parent displayed the least signs of fear, going about their business as though I had not been there. The male sang a good deal, and twice ate the *fæces*, which is as a rule unusual for this sex. The female did likewise, on three occasions at least, and spent a good deal of time cleaning both the inside and outside of the nest. Just before I left, at five o'clock, the male arrived with food, which he passed on to the female, which was brooding. She immediately arose off the nest, and fed the young, and then brooded them again, always sitting in the nest facing one way. On the 23rd, both birds again ate the *fæces*, and the male did the usual amount of singing. The eyes of the young were just appearing as tiny slits. On one occasion, the parents arrived at the nest at the same time, and standing side by side fed their young, and then placing their heads on one side, in the characteristic way, they looked and waited for the *fæces* to be voided. The male seized and ate them, and then departed, leaving the female to brood. The following day (June 24), this habit of eating the *fæces* was abandoned by both birds, as is usual in the later stages of the home life, when they are nearly always carried away by both parents. The eyes of the young were now about one-quarter open, and pin feathers were showing on the wings and down the center of the back. They were very drowsy at the time. The female again did a good deal of cleaning, both inside and outside of the nest. The male sang a little on two occasions only, although it was a beautiful afternoon. He made up for it, however, on the following day, as he sang constantly (on one occasion with food in his mouth) during the three and three-quarters of an hour I was at the nest. The sun shone brilliantly, which the young seemed to feel, as they kept twisting and moving their heads about, with mouths wide open. The female constantly stood over and

shielded them with outspread wings, whilst she preened her own feathers. The cleaning of the nest also took up a good deal of time, on one occasion this work lasting for ten minutes. At the back of the nest there was a wooden fence, and on one occasion a squirrel ran along it, and I am sure must have seen the nest, although he had no chance of investigation at the moment, as I frightened him off. The following day, the 26th, I was unable to visit the site, and when I arrived at 2 p.m. on the 27th, I saw a good many changes had taken place. The young had developed rapidly (they usually do during the last few days), and the female had given up brooding them. I was hardly surprised, however, to see only two of them in the nest, instead of three, for I had had misgivings concerning the squirrel seen on the 25th, which doubtless was the culprit. It was a very hot afternoon, and black flies were particularly troublesome, and no doubt owing to the former condition, the male did not sing at all. The following day was not much better, but the male was singing when I arrived at 1:45 p.m. The young had made wonderful strides since my last visit, but I was hardly prepared for what took place twenty-five minutes after my arrival, when one young bird made valiant efforts to leave the nest, and eventually did. Immediately afterwards, the male arrived and fed the remaining young in the nest, and removed the fæces. A minute later, the second young left the nest, and perched on a little twig at the side of it. The female arrived at this juncture, and fed young number one, which she espied on the ground as she approached the nest from below, the same as the male always did, this mode of approach apparently being characteristic when the nest is situated a few feet above the ground. Then for some unexplained reason, both parents persisted in flying all round me for a little time, but eventually went off. This was at 2:17 p.m., and three minutes later young number two essayed a descent to the ground, literally scrambling down the spiræa bush, as it was unable to fly. Thirteen minutes later, the female went to the nest, but finding no young in it, she ate the food she had brought, and removed some of the fæces. Two minutes afterwards, the male also arrived, and upon his finding no young in the nest, he also ate the food he had brought, and removed the last traces of the fæces. This was an interesting example of the

strength of this inborn habit of removing the fæces, notwithstanding the fact that there were no longer any young birds in the nest. It was also interesting to note that, although young number two was on the grass just in front of the nest, neither parent seemed to notice it. The habit performed so many times of going direct to the nest was dominant at the moment, and had to be gone through, but was broken directly after, when the parents found and enticed both young to a safer retreat, let us hope, in a little nut bush, where I left them in peace.

On the same day that I discovered the above nest, i.e. June 16, I also found one belonging to a pair of Redstarts (*Setophaga ruticilla*). This was situated in the forks of a maple sapling, three feet nine inches above the ground, and at this date contained four heavily incubated eggs. These hatched out the same day as those belonging to the above pair of Magnolia Warblers, i.e. June 20. I was unable to attend to them, however, until three days later, when I took up a position twenty-eight feet from the nest, and in full view of it. It was not long before I discovered that in this instance I had a highly nervous male to deal with, instead of a female, as was the case with the first pair of Magnolia Warblers. During the three and three-quarter hours I spent with them on this occasion, he only fed the young twice, to his partner's twenty times. He seemed literally unable to overcome his fear of my presence. Time and again he approached the nest with food, but was unable to summon up sufficient courage to feed his offspring, and eventually ate it himself, after flitting about with it in his mouth, for considerable periods at a time. This kind of thing went on until 11:30 a.m., when I decided to steal a march on him, by apparently leaving the spot, and then doubling back again, and hiding behind a large tree some little way off. Ten minutes after I left, he fed the young, and when he left the nest, I returned to my seat. He was back again in five minutes, but as soon as he saw me, the old fear returned, and he would not feed the young, but kept flitting about as before, with the food in his mouth. Four minutes later he made another attempt, but again his courage failed him, but at last, three minutes later, he fed his offspring for the first time in my presence, and removed the fæces by carrying them away and dropping them from an adjacent

tree, which seems the usual custom. He was certainly a home bird, for during this long spell of watching, he was hardly ever out of sight, and sang or chipped nearly the whole time. He had two favorite trees, one a beech, four yards from the nest, and the other a hemlock, ten yards away, in which latter he seemed to gather most of his food, which consisted of insects and not green larvæ. Once he drove off a male Red-eyed Vireo (*Vireosylva olivacea*), which encroached upon his preserves. The female was the very opposite of the male, taking not the slightest notice of my presence and going about her business as if no one was there. The young were blind and naked, with the exception of a little down on the tops of their heads, and on the wings, and along the back. In the afternoon, the male fed the young once in my presence, and I had hopes he was getting over his nervousness. The next day, however, this was not so very apparent, for he only fed the young twice, to his partner's seven times. His singing, nevertheless, was most persistent (once with food in his mouth), and he never went far from the nest. On the 25th, however, a great change had come over him, for he fed his offspring seven times to his partner's four, and seemed to have quite got rid of his fear of my presence. At 3:55 p.m., I examined the young, whose eyes were now about half open, with the feathers on wings, and down the back, developing nicely. I had hardly reached the nest, before the male arrived, and made a good deal of fuss, trailing his wings on the ground in an endeavor to draw me away. His singing again was persistent, especially from his favorite beech, and he was rarely out of sight. At five o'clock I was obliged to leave, as the mosquitos were simply unbearable, the nest being in a wood where these pests were especially numerous and venomous. It was not until the morning of the 28th, two days later, that I was able to pay these birds another visit. Arriving at ten o'clock, and seeing neither parent about, I thought I would have a look at the young. They had certainly made great progress since I last saw them, being now covered all over with feathers, and looked ready for leaving the nest, far more so, than the two young Magnolia Warblers, which were the same age as these Redstarts, and which also left their home in the afternoon of this same day. I had only retreated a few paces from the nest, when I heard a commotion, and on

looking round saw all the four young Redstarts flying to the ground. The time had arrived when my presence at the nest had aroused the innate or congenital instinct of fear in these young birds, and in consequence, they left it, no doubt somewhat earlier than they would have done had I not looked at and touched them. This only bears out the contention, already expressed, that if a true picture of the home life is desired, it is best to keep away from the young altogether. In returning to have a last look at them, I found the old birds on the scene, both of which went through the usual performance of trailing their wings on the ground, in an endeavor to divert my attention to themselves, and draw me away from the young, which were now getting scattered about in all directions, and so I left them. In summing up the results of these studies, in so far as they have gone, I think I am entitled to claim that they have brought out the following facts, viz.:

(1) That the males of the American Warblers (*Mniotiltidæ*), on the whole, sing more during the various periods of the reproductive cycle, than do the males of the Old World Warblers (*Sylviidæ*).

(2) That it is unusual for the males to sing in the nesting tree, or brood the young, this latter duty being almost entirely undertaken by the female.

(3) That the fæces as a general rule are removed by the males and not eaten, this latter habit being far more generally acquired by the females, no doubt to satisfy the pangs of hunger whilst brooding.

(4) That the usual custom, when removing the fæces, is to fly with them into a tree, and then drop them on the ground.

(5) That the males as a rule help to feed the young, and very often do most of this work.

(6) That the males are intolerant of other birds encroaching on their particular ground, and always drive them off.

(7) That the food more often than not consists of soft green larvæ, small insects and moths coming next, the males as a general rule bringing larger portions than the females.

(8) That the young may leave the nest on an average rather earlier than has generally been supposed.

(9) That in the early stages the female does far more brooding than feeding the young.

TABLE OF SUMMARIES ON SEVEN WARBLERS' NESTS

Species	Period of Observation	Hours	Number of times fed by		Average Rate of Feeding in Minutes once in	Number of times brooded by		Total time brooded Hours and Min.	Times Faeces eaten by		Times Faeces removed by		Age of Young at beginning of Observation
			Male	Female		Male	Female		Male	Female	Male	Female	
Northern Parula	June 14-19	15	45	21	13.6	1	34	11.27	0	?	0	?	Just hatched
Blue	July 5-11	15½	16	46	15.0	0	44	4.51	0	?	1	2	"
"	June 21-22	14	1	349	2.4	0	0	0	0	0	0	32	7 to 8 days
Chestnut-sided	July 6-14	18¾	58	40	11.5	0	27	6.23	0	?	13	1	One day
Magnolia	June 19-22	7	31	20	8.2	0	0	0	0	0	15	5	About 6 days
"	June 21-28	15	34	58	9.8	0	36	6.19	5	4	8	9	One day
Redstart	June 21-28	10	12	32	13.6	0	32	5.04	1	5	3	3	"

(10) That both male and female, as a general rule, always approach and leave their nests by a certain well defined route, and the female, when brooding, usually sits in the nest facing in one particular direction.

(11) That either sex may, and does at times, exhibit extreme nervousness whilst being watched, which, however, parental instinct usually overcomes in the long run.

(12) That the young are fed on an average once every ten or eleven minutes.

(13) That in the early stages, when brooding is necessary, it lasts on an average for about twelve minutes at a time.

(14) That alterations to the nesting site are always accompanied with a certain amount of risk to the young, and should therefore never be attempted, except by the experienced student, who has a definite scientific object in view.

Hatley, Que., Canada.

THE PENNSYLVANIA GERMAN NAMES OF BIRDS.

BY HERBERT H. BECK.

It is doubtful if there exists in the United States a more distinctive or more picturesque set of local names of birds than those current in southeastern Pennsylvania among that people of German-Swiss antecedents traditionally and broadly called the Pennsylvania Dutch; in a more limited way, by standard usage, the Pennsylvania Germans.

The language of these people, which is a fusion of South German dialects with an infusion of English, for two hundred years has persistently refused to be absorbed from its racial eddy by the strong stream of American life. It maintains itself as the dominant language of many rural regions of Berks, Lebanon, Monroe, Lehigh, Northampton and Schuylkill Counties, and the northern parts of Lancaster, Montgomery and Bucks Counties. Even in the larger towns like Reading, Allentown and Bethlehem, it is still actively used. In its sound, inflection and flavor it is positive and dialecti-

cally detached; and this character has strongly impressed itself upon the bird names of the region.

The settlers who established this language in America came in the early eighteenth century from the German sides of Switzerland and Holland and from Swabia, Hesse, Alsace and Saxony, but mostly from the Palatinate; which was formerly an independent state made up of what is now the upper part of Bavaria and that Rhine region bounded by Baden on the east, Baden and Alsace on the south, and Alsace-Lorraine on the west. It extended north as far as the cities of Treves and Mayence. These people first broke in the rich lands of the Lehigh and the Schuylkill valleys, then pushed into the Cumberland, the Susquehanna and the Juniata valleys, thence in scattered groups into central Pennsylvania, Maryland, Virginia and elsewhere. They were originally in greater part pioneer farmers, strong and resourceful; in mind potentially capable, but unsharpened and unextended.

A people such as this, busily occupied with the rough work of making a nation, observed only those birds of the Alleghenian and Carolinian zones which by reason of habit or character were prominent or impressive. Such species were without exception noted and named; sometimes in a way reminiscent of the European avifauna, sometimes originally and with recognition of the bird's habits or mannerisms. Thus it is that outstanding species like the Canada Goose and the Turkey Vulture have several names each in Pennsylvania German, while great families like the Warblers and the Sparrows are not noted in the language. When with the progress of American ornithology the birds of these more obscure and involved groups were differentiated, the more inquiring of the Pennsylvania "Dutch" came to know them by English or scientific names. Sometimes, though rarely, a bird is given the Pennsylvania German equivalent of its English name. Such cases are of more recent origin and they lack the true character of the names which have come down from more ancient and less admixed sources.

Pennsylvania German has attained to grammar and dictionary only within comparatively recent years. Its vocabulary and syntax are limited. The meagre literature of the dialect, while sometimes on a basis of the German alphabet, is usually spelled

phonetically. The phonetic method is used here because it is more generally readable and because it more broadly and faithfully portrays the characteristic heaviness of Pennsylvania "Dutch" as a spoken language. The conventional symbols are used to indicate vowel sounds. No consistent attempt is made to trace word origins to German sources, though they are often obvious enough and always interesting to the philologist and to the student of Germanic languages.

PYGOPODES.

Pied-billed Grebe (*Podilymbus podiceps*); Wosser Shlibber, Drek Shlibber. *Colymbus holboellii* and *C. auritus*, less common on the ponds and streams of the region, share these names with *P. podiceps* from which they are not clearly distinguished.

Loon (*Gavia immer*); Grosa Wosser Shlibber, Loon.

ANATIDAE.

All edible Ducks, as well as the three Mergansers, are known as Wilte Ent (pl. Ente). The male Mallard is sometimes called Greekop (Greenhead); and the Black Duck, Shwortsa Ent, but these distinctions are not general.

ANSERINAE.

Canada Goose (*Branta canadensis canadensis*). As an impressive and picturesque figure of the vernal and autumnal skies this species has surrounded itself with names prophetic and legendary. As a harbinger of the coming and of the going of the snow it has won the name of Schna Gons; as the result of its clanging note, which in the mass and in the night suggests a pack in full cry, it is called Awicher Yager (Ger. Ewiger Jaeger), to connect it with the story, still current in South Germany, of the restless soul of some riotous huntsman doomed to follow the hounds through eternity.¹ Again it is called Wilte Gons.

¹ The abergläubig fear of this evil spirit still exists in parts of Bavaria. Wood-choppers often make crosses on the fresh stump as a protection against the Ewiger Jaeger. In some villages in wooded regions the church bell is rung every two hours throughout the night, nominally as *Irrleite* for persons lost in the forest; but by ancient tradition and a still persistent superstition, as a safeguard against this spook. Naughty children are warned of the menace of the Ewiger Jaeger.

ARDEIDAE.

American Bittern (*Botaurus lentiginosus*), Great Blue Heron (*Ardea herodias herodias*), Green Heron (*Butorides virescens virescens*), and Black-crowned Night Heron (*Nycticorax nycticorax naevius*) are all generally called Fishroyer or Royer. *Butorides* is sometimes called Glaner Fishroyer. Also, on the basis of a habit of the species which has given rise to many of its cruder names, A'darmicha. *Nycticorax* in many parts of the region is given the onomatopoeic names of Gwock and Gwockfogel. *Casmerodius egretta* and *Florida caerulea caerulea* (Juvenal), once common and still fairly so within the region during the northward wandering of these species in the late summer and early fall, are called Groser Weiser Fishroyer and Glaner Weiser Fishroyer respectively. In a detached Pennsylvania German colony¹ the name Kranich is applied generally to the order Herodiones.

PALUDICOLAE.

Coot (*Fulica americana*). Often shot in mistake for a wild duck. Called Shdink Ent on account of its foul odor on being drawn. Also sometimes Wosserhund (probably from Wasserhuhn, European Coot).

LIMICOLAE.

Wilson's Snipe (*Gallinago delicata*), Greater Yellow-legs (*Totanus melanoleucus*), Yellow-legs (*Totanus flavipes*), Solitary Sandpiper (*Helodromas solitarius solitarius*), Spotted Sandpiper (*Actitis macularia*) and other less common species of wet meadow or mudbank are called Shneb (pl. Shneppe). *G. delicata* is sometimes specialized as Englishe Schneb; *A. macularia* as Drekschneb and Budershneb. Irregularly, for it is not well known, the Woodcock (*Philohela minor*) shares the same Schneb or it is called Grosa Brouna Shneb.

Upland Plover (*Bartramia longicauda*); Feldhinkel, Longbaniche Feldhinkel.

Kildeer (*Oxyechus vociferus vociferus*); Gilderee, Gilleree.

¹ Clearfield County.

GALLINAE.

Bob-White (*Colinus virginianus virginianus*); Bodreesel, Feldhinkel.

Ruffed Grouse (*Bonansa umbellus umbellus*); Fesond (pl. Fesonte).

Wild Turkey (*Meleagris gallopavo silvestris*); Wilte Welshhinkel.

COLUMBAE.

Passenger Pigeon (*Ectopistes migratorius*) during the days of its fleeting glory was called Wilte Doub (pl. Douba or Douwa).

Mourning Dove (*Zenaidura macroura caroliniensis*); Dord'l Doub, (pl. as above).

RAPTORES.

Turkey Vulture (*Cathartes aura septentrionalis*); Osfogel, Luder Awdler, Luder Fogel, Luder Krop and Osa (a pl. usage).

Buteonidae and Falconidae. The larger hawks are called Hinkelwoi, Woi and Boy, rarely Hawicht. This includes the common Red-shouldered Hawk (*Buteo lineatus lineatus*), Broad-winged Hawk (*B. platypterus platypterus*), Red-tailed Hawk, (*Buteo borealis borealis*), Rough-legged Hawk (*Archibuteo lagopus sancti-johannis*), Marsh Hawk (*Circus hudsonius*), the rare Goshawk (*Astur atricapillus atricapillus*), Duck Hawk (*Falco peregrinus anatum*), and approximately Cooper's Hawk, (*Accipiter cooperi*) ♀. The smaller hawks and falcons including *A. cooperi* ♂, Sharp Shinned Hawk (*A. velox*), Sparrow Hawk (*Cerchneis sparveria sparveria*) are known as Dauwa Shdosser, Dauwa Woi, Shdos Fogel and Shdos Woi.

Bald Eagle (*Haliaeetus leucocephalus*), and the former resident Golden Eagle (*Aquila chrysaetos*), are called Awdler.

Osprey (*Pandion haliaetus carolinensis*); Fishwoi, Fish Awdler and Awdler.

Barn Owl (*Tyto pratincola*); Eil and Sheier Eil.

Long-eared Owl (*Asio wilsonianus*), Short-eared Owl (*A. flammeus*), Barred Owl (*Strix varia varia*) and Great Horned Owl (*Bubo virginianus virginianus*) go under the name of Eil and Nocht Eil; *Bubo*, that of Grosa Eil.

Screech Owl (*Otus asio asio*), Shta Keitzel, Eil, Glana Eil, and Nocht Eil.

CUCULIDAE.

Yellow-billed Cuckoo (*Coccyzus americanus americanus*), and Black-billed Cuckoo (*C. erythrophthalmus*), are both known as Raya Fogel, rarely as Gukuk.

ALCEDINIDAE.

Belted Kingfisher (*Ceryle alcyon*), shares the name Fishroyer with the herons.

PICIDAE.

Downy Woodpecker (*Dryobates pubescens medianus*); Glaner Woodpicker.

Yellow-bellied Sapsucker (*Spryrapicus varius varius*); Bawm Lawffer.¹

Pileated Woodpecker (*Phloeotomus pileatus pileatus*); Huls Hock (Woodchopper).¹

Red-headed Woodpecker (*Melanerpes erythrocephalus*); Shbecht, Rodkuppicher Shbecht, Rodkup and Woodpicker.

Flicker (*Colaptes auratus luteus*); Gree Shbecht, Hexa Shbecht, and Gale Shbecht.

CAPRIMULGIDAE.

Whip-poor-will (*Antrostomus vociferus vociferus*) and Nighthawk (*Chordeiles virginianus virginianus*) are both called Wib'rwil or Wib'rewil.

MICROPODIDAE.

Chimney Swift (*Chaetura pelagica*); Shornshte Shwolm or Shwolb; also, less commonly, Roos Shwolm (Soot Swallow).

TROCHILIDAE.

Ruby-throated Hummingbird (*Archilochus colubris*); Shnaf-fag'le and Shnarrfag'le.²

TYRANNIDAE.

Kingbird (*Tyrannus tyrannus*); Eemafresser, Eema Woi.

Phoebe (*Sayornis phoebe*) and Wood Peewee (*Myiochanes virens*); Biwi.

¹ Clearfield County.

² Clearfield County.

CORVIDAE.

Blue Jay (*Cyanocitta cristata cristata*), perhaps for his rich garb and officiousness, is dignified with the name of Gudhaar, from the German word meaning landlord; also Heckert and Herrafogel. All of these names doubtless have their origin in Heher, the German word for Jay.

Crow (*Corvus brachyrhynchos brachyrhynchos*); Grob, Krop and Kraa.

ICTERIDAE.

Bobolink (*Dolichonyx oryzivorus*); Reedfogel. (The term is also used rarely for the local Rallidae, Virginia and Sora).

Cowbird (*Molothrus ater ater*); Kee Shdawr.

Red-winged Blackbird (*Agelaius phoeniceus phoeniceus*); Rodfleeg'ltter Shdawr.

Meadowlark (*Sturnella magna magna*); Larrich.

Baltimore Oriole (*Icterus galbula*); Guldts Omshel.

Purple Grackle (*Quiscalus quiscula quiscula*); Shdawr, Shwortsa Fogel.

FRINGILLIDAE.

Goldfinch (*Astragalinus tristis tristis*); Zolawd Fogel, Zolawd Shbeds'l, Gale Fogel and Guldink.

Slate-colored Junco (*Junco hyemalis hyemalis*); Shna Fogel.

Song Sparrow (*Melospiza melodia melodia*). This species particularly and all sparrow-like birds are generally given the name of Shbeds'l. In some parts of the region *Spizella passerina passerina* (Chipping Sparrow) is distinguished as Tsitcha.

Cardinal (*Cardinalis cardinalis cardinalis*); Rota Fogel.

Indigo Bunting (*Passerina cyanea*); Blofogel.

TANAGRIDAE.

Scarlet Tanager (*Piranga erythromelas*); Bludfink, Bludfogel.

HIRUNDINIDAE.

Purple Martin (*Progne subis subis*); Hous Shwolm or Shwob. One of the earliest observations in bird banding is recorded of this species from the Pennsylvania German region. In August, 1812, John Beck, grandfather of the writer, at Lititz, Lancaster

County, encased the tarsus of a Martin in chamois leather and noted the bird's return the following April.

Cliff Swallow (*Petrochelidon lunifrons lunifrons*); Drek Shwolm.

Barn Swallow (*Hirundo erythrogastra*); Sheier Swolm.

Bank Swallow (*Riparia riparia*); Sondbonk Shwolm.

Rough-winged Swallow (*Stelgidopteryx serripennis*); Cave Shwolm.

MNIOTILTIDAE.

Warblers generally are called Finka (pl.) or simply Glana Fag'le (little birds).

MIMIDAE.

Catbird (*Dumetella carolinensis*); Kotsafogel.

Brown Thrasher (*Toxostoma rufum*); Shpottfogel, Drush'l and Drushdel.

TROGLODYTIDAE.

House Wren (*Troglodytes aëdon aëdon*); Zaw Shlibber, Zounshlibber, Mouskanich.

SITTIDAE.

White-breasted Nuthatch (*Sitta carolinensis carolinensis*); Glaner Bloer Woodpicker.

TURDIDAE.

Wood Thrush (*Hylocichla mustelina*); Hulsfrush, Frush, Drush'l.

Robin (*Planesticus migratorius migratorius*). The Palatines like the Puritans blundered ornithologically in naming this common species. Everywhere in the Pennsylvania German region it is called Omshel, which originated from a fancied resemblance to the German Amsel. Omshel is probably the only other commonly used name for *P. migratorius* besides the more general one based on the Puritanic identification of the bird with the English Robin.

Bluebird (*Sialia sialis sialis*); Blofogel.

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NOTES ON THE BIRDS OF WESTERN NORTH DAKOTA.

BY IRA N. GABRIELSON AND STANLEY G. JEWETT.

WESTERN North Dakota, for the purpose of this paper, includes the Missouri River bottoms as far north as Sanish and all the territory south and west of the river. Generally speaking, this is a rolling prairie country dotted with occasional buttes rising high above the surrounding plains. The Killdeer Mountains are the largest of these and support a considerable growth of oak, alder, aspen, white birch, and other shrubs. The brakes of the Missouri River and the badlands of the Little Missouri also contain some timber—cottonwood and willow being the common trees, although others are present. In the bottoms, thickets of Buffalo-berry, buck brush, and wild rose often swarm with birds.

Mr. Jewett spent the months of June, July, and part of August of 1913, collecting for the U. S. Biological Survey. He worked from Sentinel Butte, Medora, and below Medora on the Little Missouri, at Oakdale in the Killdeer Mountains, Glen Ullin on the prairie, and Mandan and Fort Clark on the Missouri River.

Mr. Gabrielson was in the territory from July 22 to September 9, 1918, engaged in rodent control work for the U. S. Biological Survey. While in the district his work was at Bismarck, the Fort Berthold Indian Reservation on both sides of the Missouri, Oakdale in the Killdeer Mountains, and Medora, Killdeer, Dickinson, New England, and Amidon on the prairie country southwest of the Missouri. As most of Gabrielson's time was spent at the four latter places on the plains and Jewett remained in the river valley, the two sets of notes are, to a large extent, complementary.

Gabrielson had a paper based on his notes nearly completed when the discovery was made that the two sets of notes covered nearly the same district. It was therefore decided to revise this paper, incorporating Jewett's notes and making it a joint paper. This work has largely been carried out by Gabrielson, each author, however, assuming responsibility for his records.

The authors' initials are used to designate their records; where no initials appear both recorded the bird from that locality or recorded it as common over the territory covered.

Podilymbus podiceps. PIED-BILLED GREBE.—A single Pied-billed Grebe was observed diving about in a small roadside pool between Dickinson and Medora on August 17. (I.N.G.)

Sterna forsteri. FORSTER'S TERN.—Two individuals observed over a swampy creek bottom on the Fort Berthold Indian Reservation on July 31. (I.N.G.)

Anas platyrhynchos. MALLARD.—Fort Clark, July 30. (S.G.J.) Bismarck, twelve noted on Missouri, July 22. (I.N.G.) Bowman, single drake in small creek, September 9. (I.N.G.)

Querquedula discors. BLUE-WINGED TEAL.—Observed on Little Missouri below Medora, June 18. (S.G.J.) Bismarck, July 22. (I.N.G.) Bowman, September 9. (I.N.G.)

Spatula clypeata. SHOVELLER.—On Little Missouri River below Medora, June 18. (S.G.J.)

Botaurus lentiginosus. BITTERN.—Two birds were flushed in small creek bottoms on the Berthold Reservation south of the Missouri River on July 31. (I.N.G.)

Ardea herodias herodias. GREAT BLUE HERON.—A single bird on July 27, and another on July 30, near Elbowoods on the Reservation. (I.N.G.) Fort Clark, July 28 and 30. (S.G.J.)

Fulica americana. COOT.—One at Mandan, July 13. (S.G.J.)

Steganopus tricolor. WILSON'S PHALAROPE.—One flushed from a small slough near the Ree ferry across the Missouri on July 30. (I.N.G.)

Pisobia maculata. PECTORAL SANDPIPER.—Several in the slough with the Wilson's Phalarope on July 30. (I.N.G.)

Limosa fedoa. MARBLED GODWIT.—A single bird feeding in a small pool south of Bowman, on September 9. (I.N.G.)

Helodromas solitarius cinnamomeus. WESTERN SOLITARY SANDPIPER.—Several on July 30 and 31, along Missouri south of Elbowoods, and on August 11 and 12 along Little Missouri north of Killdeer. (I.N.G.)

Bartramia longicauda. UPLAND PLOVER.—Not an abundant bird but well distributed over the district as the following records show. Little Missouri below Medora, June 21, Mandan, July 14, Sentinel Butte, August 2. (S.G.J.) Bismarck, July 22; Elbowoods, July 26 and 27; Little Missouri north of Killdeer, August 6 and 12. (I.N.G.)

Actitis macularia. SPOTTED SANDPIPER.—Little Missouri below Medora, June 19, and Glen Ullin, July 10. (S.G.J.) Medora, four individuals, August 16. (I.N.G.)

Oxyechus vociferus. KILLDEER.—Both authors found the Killdeer quite common at all points visited.

Tympanuchus americanus americanus. PRAIRIE CHICKEN.—Noted at Fort Clark on east side of Missouri on July 16. (S.G.J.)

Pediocetes phasianellus campestris. PRAIRIE SHARP-TAILED GROUSE.—Quite common in the badlands and brakes of the Missouri. Particularly common on the Indian Reservation. Recorded by both authors at most points visited.

Centrocerus urophasianus. SAGE HEN.—Sentinel Butte, August 2, 3, and 4. (S.G.J.)

Zenaidura macroura marginella. WESTERN MOURNING DOVE.—Common bird throughout the entire district. It was one of the common and characteristic birds of the prairie.

Cathartes aura septentrionalis. TURKEY VULTURE.—Little Missouri below Medora, June 20. (S.G.J.) Four on August 11, and one on August 16 in Little Missouri badlands north of Killdeer. (I.N.G.)

Circus hudsonius. MARSH HAWK.—Little Missouri below Medora, June 18; Mandan, July 13, and Fort Clark, July 30. (S.G.J.) Common in all districts on the prairie, being the most abundant hawk. (I.N.G.)

Accipiter velox. SHARP-SHINNED HAWK.—Nest seven feet up in small oak tree contained three small downy young, near Oakdale, on June 28. (S.G.J.) Little Missouri bottoms north of Killdeer, August 7, Marmath, August 20. (I.N.G.)

Accipiter cooperi. COOPER'S HAWK.—An immature bird sat on a fence post while we drove slowly along the road past it. Dickinson, August 16; Marmath, August 20. (I.N.G.)

Buteo swainsoni. SWAINSON'S HAWK.—Sentinel Butte, June 5; Little Missouri below Medora, June 21; Glen Ullin, July 8. (S.G.J.) Bowman, September 9. (I.N.G.)

Archibuteo ferrugineus. FERRUGINOUS ROUGH-LEG.—Quite common, found sitting on a post or tree watching a prairie dog town. One collected at Elbowoods on July 27. (I.N.G.) Two flying over Sentinel Butte, August 3. (S.G.J.)

Aquila chrysaetos. GOLDEN EAGLE.—Two nests found at Oakdale on July 2. (S.G.J.) Sentinel Butte, August 3. (S.G.J.)

Falco mexicanus. PRAIRIE FALCON.—One noted south of Bowman on September 9, near the South Dakota line. (I.N.G.)

Falco peregrinus anatum. DUCK HAWK.—Oakdale, June 23 and 28, and Sentinel Butte, August 2. (S.G.J.) On June 23, Jewett took an adult and three young of this species at Oakdale. The young flew from the nest and one was caught alive.

Cerchneis sparveria sparveria. SPARROW HAWK.—Common throughout the entire district.

Asio flammeus. SHORT-EARED OWL.—A single bird noted about dusk between Garrison and Elbowoods the evening of July 22. (I.N.G.)

Otus asio sub-sp. (?) SCREECH OWL.—Little Missouri River bottoms, August 3. (S.G.J.) No specimens were secured and therefore we have not attempted to name the subspecies.

Bubo virginianus occidentalis. WESTERN HORNED OWL.—Sentinel Butte, collected one June 7, saw another June 8; Little Missouri below Medora, June 18; and Oakdale, June 28. (S.G.J.) Dr. H. C. Oberholser has examined the specimen collected and pronounced it to be *occidentalis*.

Nyctea nyctea. SNOWY OWL.—Sentinel Butte, June 5, mounted specimen. A large number in possession of J. D. Allen, taxidermist at Mandan. (S.G.J.)

***Speotyto cunicularia hypogaea*.** BURROWING OWL.—A very common resident of the Dickinson, Killdeer, and New England districts. Nearly every prairie dog town had its quota of these Owls and many colonies were noted far from any dog towns. This Owl's curious call was one of the characteristic sounds of the plains country. (I.N.G.) Noted Mandan, July 14. (S.G.J.)

***Coccyzus erythrophthalmus*.** BLACK-BILLED CUCKOO.—Noted on Little Missouri, June 18, and one collected at Medora on June 16. (S.G.J.)

***Ceryle alcyon alcyon*.** BELTED KINGFISHER.—Mandan, July 11, and Fort Clark, July 23 and 30. (S.G.J.) Missouri River, near Elbowoods, July 30 and 31, and on Little Missouri, August 12. (I.N.G.)

***Dryobates villosus leucomelas*.** NORTHERN HAIRY WOODPECKER.—Fort Clark, on July 17 and 23. (S.G.J.) Elbowoods, July 26. (I.N.G.) Specimens collected by Jewett were identified as *septentrionalis* by Dr. Oberholser. This is equivalent to *leucomelas* of the 1910 Check-list.

Dryobates pubescens sub-sp. (?) DOWNY WOODPECKER.—As we have no specimens no attempt has been made to name the subspecies. Fort Clark, July 23. (S.G.J.) Medora, August 16. (I.N.G.)

***Melanerpes erythrocephalus*.** RED-HEADED WOODPECKER.—Sentinel Butte, June 11; Medora, June 12, 14, 15, 16; Little Missouri below Medora, June 18 and 19. (S.G.J.) Bismarek, July 21, and Medora, August 11. (I.N.G.)

***Colaptes auratus luteus*.** NORTHERN FLICKER.—Both the Northern Flicker and the Red-shafted Flicker were common enough with perhaps this species the more common.

***Colaptes cafer collaris*.** RED-SHAFTED FLICKER.—As noted under the preceding species both forms were common. The Red-shafted Flicker was observed regularly over the plains district. Noted by Jewett at Oakdale, June 23, and Fort Clark on July 29.

***Chordeiles virginianus sennetti*.** SENNETT'S NIGHTHAWK.—One of the common birds of the prairie country. At times every post along the road held one of these birds. It was noted generally throughout the territory by both observers.

***Chaetura pelagica*.** CHIMNEY SWIFT.—Common at Bismarek on July 21 and two at Sanish on July 27. (I.N.G.)

***Tyrannus tyrannus*.** KINGBIRD.—Very common throughout the territory. One of the characteristic prairie birds.

***Tyrannus verticalis*.** ARKANSAS KINGBIRD.—Common throughout the district, though not so abundant as the Kingbird. A nest containing three nearly fledged young was found near Elbowoods on July 22. (I.N.G.)

***Sayornis sayus*.** SAY'S PHOEBE.—Noted at Sentinel Butte, June 5; Oakdale, June 23; Glen Ullin, July 7; Mandan, July 14; and Fort Clark, July 18. Two nests with young at Sentinel Butte on August 2. (S.G.J.)

***Myiochanes richardsoni richardsoni*.** WESTERN WOOD PEWEE.—Bismarek, July 21, and Little Missouri north of Killdeer, on August 7. (I.N.G.)

Empidonax minimus. LEAST FLYCATCHER.—One at Oakdale, July 1. (S.G.J.)

Otocoris alpestris enthymia. SASKATCHEWAN HORNED LARK.—Jewett's specimens from Sentinel Butte have been identified as *enthymia* by Dr. H. C. Oberholser. The Horned Lark and Chestnut-collared Longspur were the two most abundant birds of the prairie country. Recorded from every locality visited by either observer.

Pica pica hudsonia. MAGPIE.—Very common along the river bottoms. In a land where most of the common breeding birds are exceedingly inconspicuous and commonplace, two species stand out: the Burrowing Owl on the prairie and the Magpie along the streams. Go where you will along the rivers you will find the Magpies whispering and peering about from the shelter of some thick tree or scolding harshly from a safe vantage point in the top of some giant cottonwood. A flock of them furnishes endless amusement to an observer as they go poking about the garbage piles and buildings of the ranches. Knowing they are not welcome they soon become wary, but the good things to be found about the dwellings tempt them to return time after time and it must be admitted that they usually make a safe getaway. Every Indian camp has its Magpie attendants. The Indians tell tales of cattle with vitality lowered by severe winters, being attacked by the Magpies which eat great holes in their backs.

Cyanocitta cristata cristata. BLUE JAY.—Not common. Oakdale, June 28 and July 1. (S.G.J.) Four birds seen about Elbowoods, July 27, 28, 29, 30, and 31, and two on Little Missouri bottoms north of Killdeer, August 7 and 11. (I.N.G.)

Corvus brachyrhynchos hesperis. WESTERN CROW.—Common throughout the territory.

Dolichonyx oryzivorus. BOBOLINK.—Little Missouri bottoms below Medora, June 21. (S.G.J.) Bismarck, July 21; Elbowoods, July 22 and 27; and Killdeer, August 13. (I.N.G.)

Molothrus ater ater. COWBIRD.—Common throughout the territory.

Agelaius phoeniceus arctolegus. GIANT RED-WING.—Common throughout the territory wherever suitable conditions were found. Jewett's specimens of breeding birds from Medora were identified as *arctolegus* by Dr. Oberholser.

Sturnella neglecta. WESTERN MEADOWLARK.—Common bird throughout the territory. Noted at every point visited.

Icterus spurius. ORCHARD ORIOLE.—One observed in Bismarck on July 21. (I.N.G.)

Icterus bullocki. BULLOCK'S ORIOLE.—One collected at Medora, June 15. (S.G.J.)

Euphagus cyanocephalus. BREWER'S BLACKBIRD.—Common in the river bottoms. Both observers found it in such places. A flock of a dozen or more were found far out on the prairie about a homesteader's cabin near Amidon on August 20. (I.N.G.)

Quiscalus quiscula aeneus. BRONZED GRACKLE.—Common about ranch houses and river bottoms throughout the district.

Loxia curvirostra minor. CROSSBILL.—Flock flying over in Little Missouri bottoms, August 3. (S.G.J.)

Astragalinus tristis tristis. GOLDFINCH.—Common along the rivers

Calcarius ornatus. CHESTNUT-COLLARED LONGSPUR.—An exceedingly abundant bird of the region. In walking through the grass on the Berthold Reservation a constantly increasing flock of these Longspurs was flushed. (I.N.G.)

Rhynchophanes mccowni. McCOWN'S LONGSPUR.—Sentinel Butte and Fallis ranch, August 2. (S.G.J.)

Poocetes gramineus confinus. WESTERN VESPER SPARROW.—Common throughout the district. Mr. Jewett's specimens, collected at Oakdale, have been identified as *confinus* by Dr. H. C. Oberholser.

Passerculus sandwichensis subspecies? SAVANNAH SPARROW.—One Savannah Sparrow noted at Bismark, July 21, but not taken. (I.N.G.)

Ammodramus bairdi. BAIRD'S SPARROW.—In the low spots on the prairie where the grass grows taller, I found these little sparrows to be fairly common. They were particularly abundant on that part of the Berthold Indian Reservation lying north of the Missouri. Specimens were collected on July 29. (I.N.G.) One was collected at Sentinel Butte. (S.G.J.)

Ammodramus savannarum bimaculatus. WESTERN GRASSHOPPER SPARROW.—Noted below Medora on the Little Missouri, June 21. (S.G.J.)

Chondestes grammacus strigatus. WESTERN LARK SPARROW.—Fairly common over the entire district.

Spizella passerina arizonae. WESTERN CHIPPING SPARROW.—Several noted about a ranch house near Medora. (I.N.G.)

Spizella pallida. CLAY-COLORED SPARROW.—Observed at Medora, June 12, 13, and 14, and on Little Missouri below Medora, June 19 and 20. (S.G.J.) Little Missouri above Medora, August 16. (I.N.G.)

Spizella pusilla arenacea. WESTERN FIELD SPARROW.—Field Sparrows, presumably *arenacea*, were observed at Bismarck on July 21 and Medora, August 16. (I.N.G.)

Melospiza melodia juddi. DAKOTA SONG SPARROW.—Both observers found it common in the Missouri bottoms. Dr. Oberholser has identified Jewett's skins taken at Fort Clark as *juddi*.

Melospiza lincolni lincolni. LINCOLN'S SPARROW.—One noted at Medora on August 16. (I.N.G.)

Pipilo maculatus arcticus. ARCTIC TOWHEE.—Specimens collected at Elbowoods were *arcticus*. (I.N.G.) Jewett's specimens from Oakdale have been identified as *arcticus* by Dr. Oberholser. Towhees were common in river bottoms over the entire district.

Zamelodia ludoviciana. ROSE-BREADED GROSBEAK.—Noted at Mandan, July 11. (S.G.J.)

Zamelodia melanocephala. BLACK-HEADED GROSBEAK.—Sentinel Butte, June 5 and 8; Medora, June 12; and Fort Clark, July 17, 18, 23, and 30. (S.G.J.)

***Passerina cyanea*.** INDIGO BUNTING.—One at Oakdale in the Killdeer Mountains on July 6. (I.N.G.)

***Passerina amoena*.** LAZULI BUNTING.—Sentinel Butte, June 5, 8, and 9; Medora, June 11, 14, and 16; Little Missouri below Medora, June 18; Oakdale, June 22; and Fort Clark, July 19 and 28. (S.G.J.) Medora, August 16. (I.N.G.)

***Calamospiza melanocorys*.** LARK BUNTING.—Up to August 20 they were exceedingly abundant around Dickinson and Killdeer. Small flocks of them fed in the grain fields and along the roads. I also found them common at Elbowoods in July. (I.N.G.) Found at Sentinel Butte June 6, 8, and 9; Medora 11, 14, and 16; and along Little Missouri, June 18. (S.G.J.)

***Passer domesticus*.** ENGLISH SPARROW.—Found throughout the district even at remote farms and ranches in the badlands.

***Progne subis subis*.** PURPLE MARTIN.—Breeding at Bismarck, July 21; Elbowoods, July 23–26; and found at Killdeer, August 1 and 2. (I.N.G.) Noted at Mandan, July 14; and Fort Clark, July 23. (S.G.J.)

***Petrochelidon lunifrons lunifrons*.** CLIFF SWALLOW.—Two individuals south of Sanish, July 27. (I.N.G.) Noted on Little Missouri below Medora, June 21. (S.G.J.)

***Hirundo erythrogastra*.** BARN SWALLOW.—Found quite commonly about ranch buildings in Dickinson and Killdeer country. (I.N.G.) At ranch below Medora, June 18. (S.G.J.)

***Iridoprocne bicolor*.** TREE SWALLOW.—Near Elbowoods, July 26 and 27, and in Little Missouri badlands north of Killdeer on August 7. (I.N.G.)

***Riparia riparia*.** BANK SWALLOW.—Noted at Garrison on July 22; Ree Ferry, July 30; and Killdeer, July 31 and August 12. (I.N.G.)

***Bombycilla cedrorum*.** CEDAR WAXWING.—Pair at Oakdale on August 2 and small flocks at Medora on August 16. (I.N.G.)

***Lanius ludovicianus excubitorides*.** WHITE-RUMPED SHRIKE.—Shrikes noted at Garrison, July 22; Little Missouri north of Killdeer, August 7; and Amidon, August 20. (I.N.G.) Observed at Sentinel Butte, June 5; Medora, June 15; and Little Missouri below Medora, June 18. (S.G.J.) Jewett collected specimens at Glen Ullin which have been identified as *excubitorides* by Dr. Oberholser.

***Vireosylva olivacea*.** RED-EYED VIREO.—Oakdale July 1, and Fort Clark, July 16 and 17. (S.G.J.) Little Missouri north of Killdeer, August 7; and Medora, August 16. (I.N.G.)

***Vireosylva gilva swainsoni*.** WESTERN WARBLING VIREO.—Medora, June 12 and 15, and below Medora, June 18. (S.G.J.) Bismarck, July 21. (I.N.G.)

***Mniotilta varia*.** BLACK AND WHITE WARBLER.—One noted at Medora, August 16. (I.N.G.)

***Dendroica aestiva aestiva*.** YELLOW WARBLER.—Common throughout the wooded parts of the river valleys.

***Dendroica auduboni auduboni*.** AUDUBON'S WARBLER.—Noted in Little Missouri bottoms, August 3. (S.G.J.)

Seiurus aurocapillus. OVENBIRD.—One with nest and three fresh eggs at Oakdale, July 1. (S.G.J.)

Geothlypis trichas occidentalis. WESTERN YELLOW-THROAT.—Common in river bottoms. Jewett's specimens have been determined as this subspecies by Dr. Oberholser.

Icteria virens longicauda. LONG-TAILED CHAT.—Fort Clark, July 17, 25 and 30. (S.G.J.) Noted at Bismarck, July 21. (I.N.G.)

Setophaga ruticilla. REDSTART.—Oakdale, June 22, 25, and July 1; and Fort Clark, July 30. (S.G.J.) Medora, August 16. (I.N.G.)

Anthus spraguei. SPRAGUE'S PIPIT.—Seven collected near Bullion Butte, August 4. (S.G.J.) Quite common at Elbowoods, July 27 and 30; and Killdeer, July 31, August 2, 5, and 12. One found dead, August 5, from eating prairie dog poison. (I.N.G.)

Oreoscoptes montanus. SAGE THRASHER.—One seen near Medora on June 16. (S.G.J.)

Dumetella carolinensis. CATBIRD.—Common in river valleys throughout the district.

Toxostoma rufum. BROWN THRASHER.—Found commonly in river bottoms by both observers.

Salpinctes obsoletus obsoletus. ROCK WREN.—Found at Sentinel Butte, June 5; Medora, June 11, 12, 14, and 16; Oakdale, June 13; Glen Ullin, July 8; and Mandan, July 14. (S.G.J.)

Troglodytes aedon parkmani. WESTERN HOUSE WREN.—Sentinel Butte, June 8 and 12; Little Missouri below Medora, June 20 and 21; Oakdale, July 1; and Mandan, July 13. (S.G.J.) Elbowoods, July 27 and 30; Killdeer, August 5; and Medora, August 16. (I.N.G.)

Penthestes atricapillus septentrionalis. LONG-TAILED CHICKADEE.—Oakdale, June 23 and 24; and Fort Clark, July 19 and 30. (S.G.J.) Bismarck, July 21; Little Missouri north of Killdeer, August 7; and Medora, August 16. (I.N.G.)

Hylocichla fuscescens salicicola. WILLOW THRUSH.—Specimens collected at Oakdale, July 1, have been identified by Dr. Oberholser as of this subspecies. (S.G.J.)

Planesticus migratorius migratorius. ROBIN.—Common in river bottoms throughout the district.

Sialia sialis sialis. BLUEBIRD.—Noted on Little Missouri bottoms below Medora, June 20. (S.G.J.) Elbowoods, July 22 and 30; and Bismarck, July 21. (I.N.G.)

505 P. O. Bldg., Portland, Ore.

NOTES ON SOME PANAMA CANAL ZONE BIRDS WITH
SPECIAL REFERENCE TO THEIR FOOD.

BY THOMAS HALLINAN.

OBSERVATIONS were made on the occurrence and the food, nesting and general habits of 440 collected specimens, including 159 species.

The specimens have been deposited in the American Museum of Natural History, in New York City, and the identifications were made by Mr. W. deW. Miller who has remarkable ability as a taxonomist.

The scientific permit to collect these birds was issued by Governor George W. Goethals. His administration, by enforcing the existing laws, on the Panama Canal Zone, provided protection to the birds and it has made this territory as desirable to the avifauna as some of the remote, uninhabited regions on the Isthmus.

In the field work I had extensive aid from several men whose resourcefulness and persistency added largely to the observations and their names, following, I subscribe with pleasure.—Mr. Elliott F. Brown, Balboa, Canal Zone; Mr. Albert Horle, Cristobal, Canal Zone; Mr. Ernest Peterkin, United States Navy; Mr. P. T. Sealey, New York City; Mr. Ezekiel Arnott Smith, Hartford, Conn.; and Mr. Joseph W. Smith, Sisson, Calif.

The following list locates the stations, mentioned in this paper, with reference to the Panama Canal:—

Ancon Hill.—Near the Pacific entrance of the Canal.

Balboa.—Near the Pacific entrance of the Canal.

Casa Largo.—About 10 miles northeast of the junction of the Chagres River and the Canal, on the Atlantic Slope.

Corozal.—Near the Pacific entrance of the Canal.

Culebra-Arraijan Trail.—Running about 6 miles south, on the Pacific Slope, from Culebra on the Continental Divide.

Darien Radio Station.—On the Canal, about 22 miles from the Atlantic entrance, on the Atlantic Slope.

Farfan.—Near the Pacific entrance of the Canal.

Gatun.—On the Canal, about 7 miles from the Atlantic entrance, on the Atlantic Slope.

Gamboa.—On the Canal, about 25 miles from the Atlantic entrance, on the Atlantic Slope.

Gorgona.—On the Canal, about 22 miles from the Atlantic entrance, on the Atlantic Slope.

Juan Diaz.—About 14 miles east of the Pacific entrance of the Canal, on the Pacific Slope.

Juan Mina.—On the Chagres River about 6 miles northeast of the junction of the Chagres River and the Canal.

La Boca.—Near the Pacific entrance of the Canal.

Las Cascadas.—On the Canal, about 27 miles from the Atlantic entrance, on the Atlantic Slope.

Las Guacas.—On the Chagres River about 4 miles northeast of the junction of the Chagres River and the Canal.

Mindi.—On the Canal, about 5 miles from the Atlantic entrance.

Naos Island.—Near the Pacific entrance of the Canal.

New Culebra.—On the Canal, about 30 miles from the Atlantic entrance, on the Continental Divide.

Old Panama.—About 5 miles east of the Pacific entrance of the Canal, on Panama Bay.

Palo Seco.—Near the Pacific entrance of the Canal.

Rio Algarrobo.—A small stream about 7 miles northeast of the Pacific entrance of the Canal, flowing into Panama Bay.

Rio Caimitillo.—A small stream flowing into Miraflores Lake about 7 miles from the Pacific entrance.

Rio Chilibre.—A small stream flowing into the Chagres River, about 6 miles northeast of its junction with the Canal.

Rio Juan Diaz.—A small stream, about 14 miles east of the Pacific entrance of the Canal, flowing into Panama Bay.

Rio Velazquez.—A small stream, about 4 miles west of the Pacific entrance of the Canal, flowing into the Canal.

Rio Venado.—A small stream, about 5 miles west of the Pacific entrance of the Canal, flowing into Panama Bay.

Sosa Hill.—Near the Pacific entrance of the Canal.

Taboguillo Island.—Near the Pacific entrance of the Canal.

Tiger Hill.—On the Canal, about 14 miles from the Atlantic entrance, on the Atlantic Slope.

Tortola Island.—Near the Pacific entrance of the Canal.

Venado Island.—Near the Pacific entrance of the Canal.

Larus atricilla. LAUGHING GULL.—La Boca, Mar. 21, 1915. Two males. Flying over the water. This species was common in this locality. Its flight was not fast and at times large numbers could be seen resting on the water in close formation.

Sterna maxima. ROYAL TERN.—Palo Seco, Mar. 27, 1915. One male and one female. On the wing over the water about $\frac{1}{2}$ mile from shore. Scales and bones of small fish in stomach. There were several flying swiftly over a large area, diving at intervals into the water from heights of 40 feet or more. When the female was shot the male hovered around and came close to the water, several times, where the bird was floating.

Puffinus tenuirostris. SLENDER-BILLED SHEARWATER.—Naos Island, June 8, 1915. Male. Picked up on the water. There were several floating on the water in the vicinity apparently exhausted. When the bird was placed on a cake of ice it revived and became active. This observation extends the known range of this species, southward, into Central America.

Oceanodroma melania. BLACK PETREL.—Palo Seco, Mar. 24, 1915. Two males. Flying over the water about $\frac{1}{2}$ mile from shore. Particles of sea weed and a soft mass of marine forms in stomach. They were on the wing at dusk and one was seen flying in the darkness preceding a storm. Sometimes they rested on the water and sometimes they suspended themselves with a wing motion and paddled with their feet just on the surface. They flew singly over a wide area with graceful glides, rapidly moving near the surface, and at times several would congregate at one spot where they had found food. This observation extends the known range of this species, southward, into Central America.

Sula nebouxii. BLUE-FOOTED BOOBY.—(a) Tortola Island, Mar. 27, 1915. Male. On the wing $\frac{1}{2}$ mile off shore. (b) Taboguillo Island, Sept. 12, 1915. Female. Resting in trees on a rocky islet off shore. It was roosting with White-bellied Boobies.

Sula leucogastra. WHITE-BELLIED BOOBY.—(a) Taboguillo Island, Sept. 12, 1915. Three females. Resting in trees on a rocky islet off shore. One specimen had a fish, 14 inches long and 2 inches in diameter, with the head partly digested and the tail sticking out of its bill. The birds are excellent fliers, divers, and swimmers. (b) Taboguillo Island, Dec. 5, 1915. Female. In a flock flying over the water. (c) Taboguillo Island, Dec. 5, 1915. Female. Shot after leaving nest on a rocky, wooded islet, about $\frac{1}{4}$ mile off shore. The nest was on a rock shelf among the Cacti and shrubbery. It was made of sticks, dried leaves and a few feathers, flat on the rock. Two white eggs, covered with chalky deposit. There were about 20 nests in the vicinity. The birds could be approached to within a few feet, while on the nests, but would show great agitation, and if disturbed they would return quickly. All the nests had two eggs, except one, and that had a single egg.

Anhinga anhinga. AMERICAN DARTER.—On the Rio Chilibre, Jan. 16, 1916. Male. Grass tops and seeds in stomach.

Phalacrocorax vigua. BRAZILIAN CORMORANT.—(a) Old Panama, Feb. 21, 1915. Two males. Flying along the shore. In the intestines were worms, about 1 inch long and .03 inch in diameter. This species is common along the shore and on the islands of Panama Bay. On Changarmi Island, near the Pacific entrance of the Canal, they roosted at night in great numbers. (b) Farfan, Aug. 22, 1915. Resting on a Mangrove tree in a swamp. Fragments of fish in stomach.

Fregata aquila. FRIGATE BIRD.—(a) Taboguillo Island, Dec. 5, 1915. Two males. The birds carried Hippoboscidae. Balboa, May 18, 1916. Flying over the water. Female. A fish, 14 inches long, in stomach. When dynamiting was done under the water these birds learned to come quickly, by the score, to get the stunned and floating fish. (b) Taboguillo Island, Dec. 5, 1915. Flying over the water.

Querquedula discors. BLUE-WINGED TEAL.—Gamboa, Oct. 15, 1915. Female. On Gatun Lake. Grass tops and seeds in stomach.

Ajaia ajaja. ROSEATE SPOONBILL.—(a) At the mouth of the Rio Juan Diaz, Oct. 17, 1915. A small Periwinkle shell in stomach. In a flock of six, on a dead tree, in a point of woods running out into the tidal mud flats. Female. (b) At the mouth of the Rio Juan Diaz, Nov. 7, 1915. Male. Eight Periwinkle shells, $\frac{1}{8}$ inch long, in stomach. On a tree overhanging the tidal mud flats. There were a few others feeding on the mud flats.

Guara alba. WHITE IBIS.—(a) At the mouth of the Rio Juan Diaz, Oct. 3, 1915. Male. Fish scales in stomach. In a small flock in the Mangrove trees in a tidal swamp. (b) At the mouth of the Rio Juan Diaz, Nov. 7, 1915. Male. Small bivalves and fragments of crabs in stomach. On the tidal mud flats. There was a flock of more than one hundred feeding on the mud flats, in this locality. (c) Taboguillo Island, Dec. 5, 1915. Male. Cockroaches, $2\frac{1}{2}$ inches long, in stomach. On a wooded, rocky islet, about $\frac{1}{4}$ mile from shore.

Florida caerulea. LITTLE BLUE HERON.—(a) Gatun, Aug. 30, 1908. In a swamp. Gatun, Mar. 21, 1909. Two Crawfish, 3 inches long, in stomach. On a sandbar in a stream. (b) Corozal, Mar. 12, 1915. Female. In a Mangrove swamp. (c) Corozal, Mar. 12, 1915. Female. Small Coleoptera in stomach. In a Mangrove swamp. (d) On the Rio Venado, Mar. 27, 1915. Male. Shrimps, $1\frac{1}{2}$ inches long, and crab legs, 2 inches long, in stomach. In a Mangrove tree. (e) Farfan, May 2, 1915. Female. Two crabs, with bodies, $\frac{3}{4}$ inch in diameter, and legs, $1\frac{1}{2}$ inches long, were in the neck. In a Mangrove swamp. (f) Darien Radio Station, Dec. 12, 1915. Male. Grass seeds, Locustidae and other Orthoptera in stomach. On the floating islands of grass and Water Lettuce. (g) Balboa, Dec. 25, 1915. Male. Small crabs in stomach. On the mud banks of a tidal stream. (h) On the Rio Chilibre, Jan. 1, 1916. Two males. Locustidae

and other Orthoptera and large Spiders in the stomachs. There were about 12 in a scattered flock but they are usually seen singly.

Butorides virescens. LITTLE GREEN HERON.—(a) Corozal, Nov. 12, 1915. Female. In the mud in a Mangrove swamp. (b) On the Rio Juan Diaz, Oct. 10, 1915. Female. (c) Corozal, May 6, 1916. Two males. In a Mangrove swamp. (d) Balboa, May 13, 1916. Shot after flying from nest in a Mangrove swamp. The nest was built on a shrub, about 8 feet above the water. It was made of dried twigs, well woven, but with no lining. Three eggs pale bluish-green. A similar nest nearby had two fledglings and one egg.

Nycticorax nycticorax naevius. BLACK-CROWNED NIGHT HERON.—(a) Corozal, Dec. 25, 1915. Male. In a swamp. They were numerous and roosted in the same trees with the Yellow-crowned Night Herons and the Boat-billed Herons. (b) Corozal, Mar. 10, 1915. Male. In a flock of about 15 in a Mangrove swamp. The birds perched on the trees in the swamp and waded in the mud in the tidal streams. (c) On San Jose Rock, near Naos Island, Mar. 21, 1915 there were about 20 nests, apparently of this species. The nests were built from 4 to 25 feet from the ground among the thorn, trees, Cacti, and vines, on the rocky slope of the island. Some of the nests had fledgling birds.

Nyctanassa violacea. YELLOW-CROWNED NIGHT HERON.—(a) Taboguillo Island, Aug. 15, 1915. Female. Near the water on a rocky shore. There were several small flocks of from 2 to 12 seen on the islands of Panama Bay. (b) At the mouth of the Rio Juan Diaz, Oct. 3, 1915. Male. In a flock of 50 or more resting in the Mangrove trees in a tidal swamp. (c) On the Rio Juan Diaz, Oct. 10, 1915. Female. Fragments of a crab, with a body $1\frac{1}{2}$ inches in diameter, in stomach.

Cochlearius zeledoni. BOAT-BILLED HERON.—(a) Corozal, Mar. 12, 1915. Male. In a Mangrove swamp. (b) Corozal, Dec. 25, 1915. Female. In a Mangrove swamp. There were a number of these birds and they roosted in the same trees with the Black-crowned Night Herons and the Yellow-crowned Night Herons. (c) Balboa, May 6, 1916. Male. In a flock of eight in a Mangrove swamp. (d) Corozal, Mar. 10, 1915. Male. In a Mangrove swamp. There were several in the trees and they squaked like small pups barking. A number of young birds climbed about the limbs and flew short distances and when approached they loudly snapped their bills. There were seven nests built, about 10 feet high, near the ends of the branches of the Mangrove trees. One nest, with a young bird perched on it, had eight 2-inch, partly decomposed fish on the edge. In the shallow water under the nest was one white egg.

Ionornis martinica. PURPLE GALLINULE.—Las Guacas, Nov. 28, 1915. Three males. Grass seeds and grass tops in stomach. Resting on Plantain leaves in a plantation.

Ereunetes mauri. WESTERN SANDPIPER.—At the mouth of the Rio Juan Diaz, Oct. 3, 1915. Sick bird picked up on the tidal mud flats.

Immense numbers, running into tens of thousands, were feeding on the mud flats. They were very tame and could be approached to within a few feet.

Symphemia semipalmata. WILLET.—(a) At the mouth of the Rio Juan Diaz, Oct. 10, 1915. Male. Fragments of small crabs in stomach. On the tidal mud under the trees. (b) At the mouth of the Rio Juan Diaz, Oct. 17, 1915. Two males. Fragments of crabs in stomach. There were about 40 of this species on the tidal mud flats.

Bartramia longicauda. BARTRAMIAN SANDPIPER.—La Boca, Oct. 26, 1915. Male. One Periwinkle shell, $\frac{1}{4}$ inch long, in stomach. In a big clearing, about $\frac{1}{2}$ mile from the shore.

Actitis macularia. SPOTTED SANDPIPER.—Old Panama, Feb. 21, 1915. Fragments of small crabs in stomach. Running among the rocks near the shore. There were a number of these birds along the tide beach and they sought their food singly, occasionally two would be together, and within a mile there would be 20 or more scattered among the rocks on the sand beach.

Numenius hudsonicus. HUDSONIAN CURLEW.—(a) On the Rio Juan Diaz, Oct. 10, 1915. Two females. On the mud banks under the trees. Small crabs in stomach. They were quite numerous in this locality. (b) At the mouth of the Rio Juan Diaz, Oct. 17, 1915. Two females. Fragments of crabs in stomach. On the tidal mud flats. There were several small flocks along the shore between Balboa and the Rio Juan Diaz. (c) At the mouth of the Rio Juan Diaz, Nov. 7, 1915. One male and one female. On the low branches of trees after the tide had covered the mudflats.

Squatarola squatarola. BLACK-BELLIED PLOVER.—At the mouth of the Rio Venado, Mar. 27, 1915. In a flock, of about 15, scattered over the rocks and sand beach.

Charadrius semipalmatus. SEMIPALMATED PLOVER.—(a) At the mouth of the Rio Venado, Mar. 27, 1915. Two females. In a flock, of about 10 birds, walking and feeding in the mud near the water. They sought food in close formation and flew, rapidly, short distances in close formation. (b) At the mouth of the Rio Juan Diaz, Oct. 17, 1915. Male. Feeding on the mud flats. They were in company with Western Sandpipers but were not near so numerous.

Pagolla wilsonia. WILSON'S PLOVER.—Near Panama City, Aug. 11, 1907. On the shore.

Arenaria interpres. TURNSTONE.—(a) San Jose Rock, near Naos Island, Mar. 21, 1915. In a flock, of about 20, coming to rest on the rock. (b) Venado Island, Mar. 24, 1915. Two males. Fragments of shells of small bivalves in stomach. In a flock of about 15 birds. There were two flocks, with a total of about 25 birds, on Venado and Cocovi Islands. They flew in close formation and when at rest, after short flights, they sought food in close formation.

Jacana nigra. BLACK JACANA.—(a) On the Rio Chilibre, Jan. 1, 1916. Three females. Small seeds in stomach. On floating vegetation. (b) Darien

Radio Station, Dec. 12, 1915. Female. Vegetable matter and 1/16 inch, white pebbles in stomach. Feeding on the floating islands of grass and Water Lettuce on Gatun Lake. Two well formed eggs in the ovaries. This species is found in small flocks and they run rapidly on the floating grass and Water Lettuce and are very conspicuous on the wing. (c) Darien Radio Station, Dec. 12, 1915. One male and one female. Grass tops and grass seeds in stomach. Feeding on the floating grass and Water Lettuce on Gatun Lake.

Crypturus soui panamensis. PILEATED TINAMOU.—Sosa Hill, May 25, 1914. Small seeds, some sprouted, in stomach. In the thick jungle. It ran rapidly on the ground, with occasional short flights.

Columba speciosa. SPLENDID PIGEON.—In the valley of the Rio Velazquez, Feb. 13, 1916. One male and one female. Berries in crop. On very high trees.

Chaemapelia minuta elaeodes. PLAIN-BREADED GROUND DOVE.—(a) Gatun, May 26, 1909. Grass seeds in crop. Shot after leaving the nest. The nest was built, about 5 feet from the ground, in a thorn shrub, growing in high rank grass. It was made loosely of twigs with growing grass woven with them. Two eggs, glossy white but not highly polished. One measured 1.08 by .64 inches. (b) Mindi, July 11, 1915. Male. Grass seeds in stomach. Perched on a tree. (c) Cruces Trail, near Corozal, Sept. 5, 1915. Male. Grass seeds in crop. This species is numerous and they are found in small flocks on the ground and in the low shrubbery. They have a soft, pleasing call. (d) Cruces Trail, near Corozal, Sept. 19, 1915. Female. Grass seeds in crop. (e) Corozal, May 21, 1916. Two females. Grass and sedge seeds in stomach.

Chaemapelia rufipennis rufipennis. RUDDY GROUND DOVE.—(a) Gatun, April 11, 1909. Shot while leaving the nest. The nest was in a crotch of a tree about 12 feet from the ground. It was made loosely of twigs, bits of grass, and leaves. Two eggs, glossy white and highly polished, .88 by .68 and .88 by .67 inches. The bird could be closely approached while on the nest. (b) Gatun, April 29, 1909. Small grass seeds in stomach. Shot while leaving nest. The nest was on a hanging vine, about 10 feet from the ground, somewhat in the open. It was loosely built of small twigs, bits of bark, and grass. Two eggs, one measured .94 by .67 inches.

Claravis pretiosa. BLUE GROUND DOVE.—In the valley of the Rio Algarrobo, July 4, 1915. Male. Seeds like Cucumber in stomach. In a clearing.

Leptotila cassini. CASSIN'S DOVE.—(a) Gatun, Feb. 11, 1909. Fine gravel, millet and sedge seeds, and small white berries in crop. Walking about, beneath the shrubbery, on a creek bank. (b) Gatun, May 4, 1909. Millet seeds and small berries in crop. Shot on the edge of the nest. The nest was about 6 feet from the ground on a limb of a shrub, in high grass, and partly supported by vines. It was loosely made of twigs which were woven in with the growing grass tops. There was one hatched chick and

one, glossy white, egg, 1.19 by .86 inches. A similar nest at Gatun, Sept. 3, 1908, very probably the same species, was on a shrub, about 6 feet from the ground. It was made of twigs, laid loosely on some interlaced branches and the egg could be seen through the bottom of the nest. The egg was glossy white, 1.10 by .83 inches.

Leptotila verreauxi verreauxi. VERREAUX'S DOVE.—(a) Sosa Hill, May 26, 1914. Male. About 40 seeds, $\frac{1}{4}$ by $\frac{1}{4}$ by $\frac{1}{4}$ inches, were in the stomach and crop. (b) Farfan, Aug. 22, 1915. One male and one female. Buds, from a $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, and seeds in stomach. In Cacti and shrubbery. (c) Cruces Trail, near Corozal, Sept. 5, 1915. Female. Grass seeds in crop. There was a Dipterous larva in the flesh, under the left wing, and another in the flesh of the abdomen. They had fed on the head and left larva skins and putrid flesh. When the bird was put on ice the larvae pupated and died soon after. (d) Gorgona, Feb. 20, 1916. Female. In sparse shrubbery.

Cathartes aura. TURKEY VULTURE.—Farfan, Jan. 9, 1916. Two males and one female. On a tree near the shore. There were several roosting in the nearby trees and when the skinned bodies of the birds, that were shot, were thrown on the beach, the others ate them up. The species is very common on the Isthmus and they roost in great numbers on Ancon Hill, overlooking the City of Panama.

Leptodon palliatus. CAYENNE KITE.—Gatun, Mar. 28, 1909. In the early morning, in a tree overhanging a stream.

Asturina nitida. SHINING BUZZARD HAWK.—Mindi, Jan. 28, 1909. Frog, 2 inches long, in the neck. On the wing over a swamp.

Buteo brachyurus. SHORT-TAILED BUZZARD.—Gatun, Feb. 11, 1909. Fragments of a small bird in stomach. Shot on a limb of a dead tree, about 75 feet high, over a creek bottom, while eating two 14-inch Ground Lizards (*Ameiva ameiva praesignis*).

Buteo platypterus. BROAD-WINGED HAWK.—(a) Gatun, Feb. 19, 1909. Acridiidae in stomach. In a clearing. (b) New Culebra, Nov. 25, 1915. Male. (c) In the valley of the Rio Chilibre, Jan. 1, 1916. Female. Small Iguana in stomach. The bird carried Hippoboscidae.

Rupornis ruficauda. HAWK.—Culebra-Arraijan Trail, Nov. 26, 1914. In a tree in the jungle. The head and tail of a 15-inch Ground Lizard (*Ameiva ameiva praesignis*) were partly swallowed. The bird carried Hippoboscidae.

Urubitinga anthracina. MEXICAN BLACK HAWK.—(a) At the mouth of the Rio Juan Diaz, Oct. 3, 1915. Female. Vertebrae of small mammal in stomach. In a Cocoa Palm. (b) At the mouth of the Rio Juan Diaz, Oct. 10, 1915. Two immature females and one adult male. Crab fragments in stomachs. On high sparse-leaved trees. (c) Ancon, Jan. 16, 1916. Male. In a tree.

Cerchneis sparveria. SPARROW HAWK.—(a) Gatun, Feb. 10, 1909. Small Spiders and small Acridiidae in stomach. In a big clearing in the

late afternoon. (b) La Boca, Feb. 22, 1915. Acridiidae in stomach. In a tree in a clearing. (c) New Culebra, Oct. 23, 1915. Female. Acridiidae and fragments of an Iguana, 12 inches long, in stomach. On an electric transmission line. (d) New Culebra, Oct. 23, 1915. Female. Acridiidae, Iguana, 5 inches long, and two Ground Lizards (*Ameiva ameiva praesignis*), 4 inches long, in stomach.

***Cerchneis sparveria phaloena*.** SPARROW HAWK.—New Culebra, Nov. 25, 1915. Female. Acridiidae in stomach. On an electric transmission line.

***Pandion halliaetus carolinensis*.** FISH HAWK.—Farfan, Dec. 19, 1915. Male. On a high tree near the shore.

***Tyto perlata guatemalae*.** CENTRAL AMERICAN BARN OWL.—Old Panama, Aug. 11, 1907. In the ruins of the Merced Convent Tower.

***Otus choliba*.** CHOLIBA SCREECH OWL.—(a) On the slope of Ancon Hill, Jan. 29, 1916. Female. Shrub seeds in stomach. Perched in dense vegetation, at noon. (b) Sosa Hill, May 23, 1916. Female. A large number of red, leaf-cutting Ants in stomach. In dense shrubbery at mid-day. (c) On the Culebra-Arraijan Trail, Jan. 1, 1915. Female. Orthoptera and Odonata in stomach. On the nest in mid-afternoon. The nest was in the top of a dead and decayed stump of a palm, about 9 feet high and about one foot in diameter. It was made of the fiber from the stump. There were several eggs in the ovaries of the bird and three white eggs in the nest. They measured 1.32 by 1.12, 1.39 by 1.19 and 1.39 by 1.21 inches.

***Rhinoptynx clamator*.** STRIPED HORNED OWL.—(a) Balboa, Feb. 26, 1915. Male. Small feathers in stomach. Perched on a pole in a clearing at the fall of dusk. (b) Balboa, Sept. 3, 1915. Perched on a dead tree, in a clearing, at dusk. This bird, for several evenings at dusk, flew out of the jungle on Sosa Hill and rested on a dead tree.

***Ciccaba nigrolineata nigrolineata*.** BLACK-AND-WHITE OWL.—(a) Gatun, Feb. 11, 1909. By the roadside, on a dead tree, at dusk. (b) Tiger Hill, Feb. 20, 1909. Spotted at night, with a light, in a dense jungle. The lucidium tapetum in this bird's eyes reflects the light strongly in the dark. It had a cat-like call.

***Brotogeris jugularis*.** MULLER'S PARRAKEET.—(a) Gatun, Aug. 30, 1908. On a tree in a clearing. (b) Gatun, Feb. 11, 1909. About 75 feet high, on a sparse-leaved tree, in a clearing. (c) Farfan, Mar. 26, 1915. Male. About 20 soft white fruit seeds, about $\frac{1}{4}$ inch in diameter, in stomach. In a sparse-leaved tree over the jungle. This species is very common on the Isthmus and they fly in flocks, of from 5 to 50, with a noisy chatter while in flight. (d) Farfan, May 23, 1915. Female. Green vegetable matter in stomach. On a high, sparse-leaved tree in a clearing. (e) Gorgona, Feb. 20, 1916. Male. Fruit fragments in stomach. On a sparse-leaved tree in a clearing.

***Eucinetus haematotis coccin collaris*.** RED-NECKLACED PARROT.—Las Guacas, Nov. 28, 1915. Male. Fruit seeds in stomach. In a cultivated plantation. There were several flocks in this locality.

Amazona farinosa inornata. MEALY AMAZON PARROT.—Casa Largo, May 31, 1914. Male. Large green seeds in stomach. In a high-timbered forest. There were several hundred in this locality.

Crotophaga ani. ANI.—(a) Corozal, July 28, 1907. In shrubbery in a clearing. (b) Farfan, May 16, 1915. Grass seeds and Locustidae in stomach. Female. This species was frequently seen, in flocks of from 10 to 20, in the shrubbery, in the clearings. (c) On the Rio Algarrobo, May 30, 1915. Female. Seeds, similar to Cucumber, in stomach. In the jungle along the river.

Coccyzus rutila panamensis. PANAMA CUCKOO.—Gatun, April 21, 1909. Two specimens, Small Coleoptera and larvae, about 1 inch long, in stomach. In the jungle.

Playa cayana. CENTRAL AMERICAN SQUIRREL-CUCKOO.—(a) Gatun, Feb. 3, 1909. In thick jungle. (b) In the valley of the Rio Algarrobo, May 30, 1915. Male. Hemiptera and one Locustidae in stomach. In the jungle. (c) In the valley of the Rio Algarrobo, June 6, 1915. Male. One Locustidae, 3 inches long, and 14 strong-smelling Hemiptera, $\frac{1}{2}$ inch long, in stomach. In the jungle. (d) Cruces Trail, near Corozal, Sept. 5, 1915. Male. One Locustidae, 3 inches long, in stomach. In a thick-leaved, high tree. (e) New Culebra, Oct. 24, 1915. Lepidoptera larvae, one, 3 inches long, and two, 2 inches long, in stomach. Female. In a Cocoa plantation. (f) Las Guacas, Nov. 28, 1915. Male. Small seeds and Lepidoptera larvae in stomach.

Tapera naevius. NORTHERN STRIPED CUCKOO.—In the valley of the Rio Algarrobo, June 6, 1916. Acridiidae, $\frac{1}{2}$ inch long, in stomach. In the jungle.

Trogonurus curucui tenellus. GRACEFUL TROGON.—(a) Gatun, Feb. 11, 1909. In thick jungle in a creek bottom. (b) Gatun, Feb. 17, 1909. In thick jungle in a creek bottom.

Curucujus massena. MASSENA TROGON.—(a) In the valley of the Rio Chilibre, Jan. 1, 1916. Female. Fruit and fruit seeds in stomach. On a tree. (b) In the valley of the Rio Chilibre, Jan. 16, 1916. Immature male. Fruit fragments in stomach. On a tree. This is a solitary bird. (c) Juan Mina, Feb. 21, 1916. Female. Hard shrub seeds in stomach. In a forest of large trees.

Notharchus pectoralis. BLACK-BREASTED PUFF-BIRD.—In the valley of the Rio Caimitillo, Oct. 20, 1915. Small Acridiidae and Coleoptera in stomach. In a tree.

Streptoceryle torquata. RINGED KINGFISHER.—(a) Gatun, Aug. 30, 1908. On a river bank. (b) On the Rio Juan Diaz, Oct. 10, 1915. Male. Bone structure of a fish, about 10 inches long, in stomach. On a leafless branch, overhanging the river. (c) On the Rio Juan Diaz, Oct. 10, 1915. Female. Fish fragments in stomach. On a leafless branch overhanging the river.

Chloroceryle amazona. AMAZON KINGFISHER.—(a) On the Rio Juan Diaz, Oct. 10, 1915. Female. Fish fragments in stomach. On a leafless

branch, overhanging the river. (b) On the Rio Chilibre, Jan. 1, 1916. One male and two females. Fish fragments in stomachs. On branches overhanging the river.

Chloroceryle americana isthmica. ISTHMIAN GREEN KINGFISHER.—(a) Gatun, Feb. 1, 1909. On a limb, overhanging a creek. (b) Old Panama, Feb. 21, 1915. Several fish, about 2 inches long, in stomach. Shot after flying from the shore to a rock in the water. (c) Darien Radio Station, Dec. 12, 1915. Two females. Small fish in stomach. On a limb of dead tree in Gatun Lake. The Kingfishers were numerous on this newly created lake as it had a large population of fish, because the insects were plentiful in the dying trees.

Chloroceryle aenea aenea. LEAST GREEN KINGFISHER.—On the Rio Chilibre, Jan. 16, 1916. Male. On a small limb close to the river's edge.

Urospatha martii semirufa. GREATER RUFOUS MOTMOT.—Gatun, Feb. 10, 1909. Several Spiders, several Coleoptera, some an inch in length, and a fish, 4 inches long, were in the stomach. In the dense jungle.

Electron platyrhynchus minor. LESSER BROAD-BILLED MOTMOT.—In the valley of the Rio Chilibre, May 31, 1914. Male. Lepidoptera larva, about 2 inches long, in stomach. In a tree about 150 feet from the ground.

Centurus rubricapillus. WAGLER'S WOODPECKER.—(a) Farfan, Feb. 28, 1915. Male. Small Coleoptera and insect eggs in stomach. On a leafless tree. (b) Farfan, Mar. 26, 1915. Male. Three hard-shelled berries, about $\frac{3}{8}$ inch in diameter, in stomach. On a leafless tree. (c) Farfan, May 16, 1915. Female. Mass of green vegetable matter in stomach. On a Cottonwood tree. (d) Darien Radio Station, Dec. 12, 1915. Female. Hard seeds, $\frac{1}{8}$ by $\frac{1}{4}$ inch, in stomach. On a tree.

Melanerpes pucherani. WHITE-BARRED WOODPECKER.—Gatun, Sept. 6, 1908. On a tree in a clearing.

Rhamphastos piscivorus brevicarinatus. SHORT-KEELED TOUCAN.—(a) New Culebra, Nov. 3, 1915. Female. Fragments of green fruit in stomach. On a Papaw tree. (b) In the valley of the Rio Chilibre, Jan. 16, 1916. Fruit fragments in stomach. Male. In a flock, of about 20, in a forest.

Pteroglossus torquatus. COLLARED ARACARI.—Las Guacas, Nov. 28, 1915. Three females. Fragments of fruit, like green Papaw, in stomach. Small flocks were seen in a cultivated plantation and, in the forests, in the valley of the Rio Chilibre.

Nyctidromus albicollis albicollis. PARAUQUE.—(a) Mindi, Feb. 19, 1909. Two specimens. Small insects and a Coleoptera, $1\frac{1}{2}$ inches long, in stomach. Spotted at night with a light, on the ground, on a trail. The bird turns one eye to the light and the lucidium tapetum, in the eye, reflects the light strongly in the dark. (b) Gatun, April 11, 1909. In a clump of shrubbery in a clearing, at noon. (c) Sosa Hill, May 14, 1914. Male. About 20 Coleoptera in stomach. On the ground, during the day, in a dense jungle. (d) New Culebra, Oct. 23, 1915. Two males and one female.

Insects in stomach. (e) Cruces Trail, near Corozal, Dec. 24, 1915. Four males and two females. (1) Small and medium-sized Coleoptera and large Diptera in stomach. (2) Small Mantispidae, small Locustidae, small Coleoptera, and a large Tipulidae in stomach. (3) Small Coleoptera and Diptera in stomach. (4) Small Coleoptera and small, hard, white seeds in stomach. (5) Small, hard, white seeds and two Heterocera, with 2½ inch wing expanse, in stomach. (6) Small Coleoptera and Diptera in stomach.

Stenopsis cayennensis albicauda. WHITE-TAILED STENOPSIS.—Corozal, July 28, 1907.

Chordeiles acutipennis texensis. TEXAS NIGHTHAWK.—Corozal, Mar. 10, 1915. Two females. Small Coleoptera in stomach. Resting on the ground, in the late afternoon, in a shady Mangrove swamp.

Chordeiles minor subsp. NIGHTHAWK.—(a) Corozal, Jan. 30, 1916. Female. Small Coleoptera and small red Ants in stomach. Shot on a low branch, after flying from the ground, at noon, in a swamp. (b) Balboa, May 13, 1916. Female. Insects and fragments of Unio shell in stomach. One egg was well developed in the ovaries. Shot on a low branch, after flying from the ground, at noon, on the edge of a Mangrove swamp. (c) Corozal, May 21, 1916. Male. Insects in stomach. Small flock on the wing, in mid-afternoon, in a drizzling rain, darting after insects. At intervals, they gave a penetrative "squeek."

Phoebastria adolphus saturatus. DUSKY HERMIT.—Las Cascadas, May 17, 1908. In the jungle.

Glaucidium hirsutum affinis. LESSER HAIRY HERMIT.—New Culebra, Nov. 3, 1915. Female. On an open trail.

Chalybura buffonii. BUFFON'S PLUMELETER.—(a) Las Cascadas, May 17, 1908. In the jungle. New Culebra, Nov. 3, 1915. Male. On an open trail. (b) In the valley of the Rio Velazquez, May 15, 1916. Male. In the jungle.

Amazilia tzacatl tzacatl. RIEFFER'S HUMMING-BIRD.—(a) Las Cascadas, May 17, 1908. In the jungle. (b) Gatun, April 22, 1909. (c) Cruces Trail, near Corozal, Sept. 5, 1915. Male. Small insects in stomach. (d) Cruces Trail, near Corozal, Sept. 19, 1915. Male. (e) New Culebra, Nov. 3, 1915. Male. On an open trail. (f) Corozal, May 21, 1916. Male. Insects in stomach. Resting on a twig.

Saucerottia edwardi. WILSON'S HUMMING-BIRD.—Sosa Hill, July 18, 1915. Male.

Damophila panamensis. PANAMA HUMMING-BIRD.—(a) Cruces Trail, near Corozal, Sept. 5, 1915. Two specimens. Small insects in stomach. (b) Cruces Trail, near Corozal, Sept. 19, 1915. Two specimens.

Polyerata amabilis. LOVELY HUMMING-BIRD.—Gatun, Aug. 26, 1908. In the jungle.

Thalurania colombica colombica. COLOMBIAN WOOD-NYPH.—Gatun, Nov. 24, 1908. Picked up wounded, after flying against a telephone wire.

Lepidopyga caeruleocularis. DUCHASSAIN'S HUMMING-BIRD.—(a) Sosa Hill, Sept. 11, 1907. Resting on a dead branch. (b) Sosa Hill, Sept. 13, 1907. Two specimens. Resting on dead branches. (c) Corozal, Mar. 12, 1915. Three specimens. In a Mangrove swamp. (d) Mindi, July 11, 1915. Male. On an open road. (e) Cruces Trail, near Corozal, Sept. 5, 1915. Female. Small insects in stomach.

Chlorostilbon assimilis. ALLIED EMERALD.—(a) Corozal, Sept. 8, 1907. Resting on a dead branch. (b) Gorgona, Feb. 20, 1916. Female. Resting on a branch in sparse shrubbery.

Copurus leuconotus. WHITE-BACKED COPURUS.—(a) Gatun, Oct. 12, 1908. In a marsh. (b) Gatun, Oct. 18, 1908. In a flock of about 10, on a dead sapling, in a clearing. (c) Gatun, Nov. 18, 1908. This species is generally found perched on a dead branch and when an insect passes, they quickly dart out and catch it. The long feathers in the tail apparently aid them in turning rapidly when pursuing insects which have a jerky flight. (d) Darien Radio Station, Dec. 12, 1915. Male. Small Coleoptera, Diptera and Hymenoptera in stomach. On a high dead tree in Gatun Lake. (e) Darien Radio Station, Dec. 12, 1915. Female. Small Diptera and Hymenoptera in stomach. On a high dead tree in Gatun Lake. (f) In the valley of the Rio Chilibre, Jan. 1, 1916. Male. On a high tree. Numerous in this valley.

Oncostoma olivaceum. LAWRENCE'S BENT-BILLED FLYCATCHER.—In the valley of the Rio Velazquez, Feb. 13, 1916. Male. This bird perches, quite motionless, in the thick shrubbery and huddles close to the branch, with its head elevated and gives a soft, peculiar call.

Todirostrum cinereum finitimum. NORTHERN TODY-FLYCATCHER.—Sosa Hill, Sept. 26, 1915. One male and one female. Insects in stomach. In dense vines and shrubbery.

Todirostrum schistaceiceps. SLATE-HEADED TODY-FLYCATCHER.—Balboa, June 30, 1915. Male. Small seeds in stomach. In tall grass in a clearing.

Atalotriccus pilaris pilaris. PYGMY FLYCATCHER.—(a) Farfan, Jan. 23, 1916. Male. Small insects in stomach. In thick shrubbery. (b) Farfan, May 11, 1916. One male and one female. Small seeds in stomach. In shrubbery. There were about 6 in the flock and at times they would chase each other rapidly through the shrubbery with a noisy twitter and then rest for long periods on bare twigs with their feathers puffed out, uttering sharp twitters at intervals. (c) Farfan, May 14, 1916. Female. In shrubbery.

Camptostoma pusillum flaviventre. YELLOW-BELLIED CAMPTOSTOMA.—Sosa Hill, Feb. 26, 1915. In shrubbery.

Elaenia flavogaster subpagana. NORTHERN ELAENIA.—(a) Gatun, Mar. 31, 1909. Shot after leaving the nest at noon. The nest was about 5 feet from the ground, on a tree near the river's edge. It was made of grass, leaves and fibrous roots, closely woven, with a few feathers on the inside and bits of bark and lichen on the outside, making it resemble the

limb which was about an inch thick. The nest cavity was 3 inches in diameter and $1\frac{1}{2}$ inches deep with two eggs, dull white, with reddish-brown and faint purple spots which were almost entirely confined to the larger end and they measured .86 by .65 and .85 by .63 inches. (b) Gatun, April 13, 1909. One specimen. (c) Farfan, Feb. 6, 1916. Female. The nest was suspended near the end of a long limb, about 6 feet above the water and about 10 feet from the shore. It was made of dried grass and lined with finer, dry grass with the opening concealed by the grass ends and its outside diameters were 7 and 11 inches. Four eggs, dull white, with reddish-brown and purple spots, mostly on the larger end, and one measured .77 by .61 inches. A similar nest was suspended, about 30 feet high, on the end of a limb on a thorn tree. It was made of coarse grass and leaves and lined with fine grass, with the opening concealed by the grass ends. Three eggs, dull white, with reddish-brown and purple spots, mostly on the larger end, and measured .91 by .65, .91 by .66 and .90 by .67 inches. (d) Gatun, April 25, 1909. Shot after leaving nest. The nest was on a thorn tree at the extremity of a lower limb, about 12 feet from the ground. It was made of grass, fine roots, and cotton waste, from a nearby oil house lined with fine grass and the opening concealed with the grass tops. Two eggs, pointed, dull white, with reddish-brown and purple spots, mostly on the larger end, and one measured .92 by .60 inches. (e) Gatun, May 8, 1909. Shot after leaving nest. The nest was on a thorn tree at the extremity of a lower limb, about 15 feet from the ground. It was made of grass, fine roots, and cotton waste, from a nearby oil house, lined with fine grass with the opening concealed by the grass ends and its outside diameters were 5 and 8 inches. Two eggs, pointed, dull white, with reddish-brown and purple spots mostly on the larger end and one measured .93 by .67 inches.

***Elaenia chiriquensis*.** LAWRENCE'S FLYCATCHER.—(a) In the valley of the Rio Velazquez, Feb. 13, 1916. Male. Shrub berries in stomach. In shrubbery. (b) Balboa, May 13, 1916. Female. Insects in stomach. On the edge of a Mangrove swamp.

***Capsiempis flaveola*.** YELLOW FLYCATCHER.—(a) Farfan, June 20, 1915. Female. In a clump of shrubbery in a clearing. Coleoptera and a nymph of a Locustidae in stomach. (b) Corozal, May 21, 1916. Male. Insects in stomach. In shrubbery.

***Myiobius barbatus atricaudus*.** BLACK-TAILED MYIOBIUS.—In the valley of the Rio Algarrobo, July 4, 1915. Male. Seeds and small insects in stomach. In the jungle.

***Myiochanes richardsoni*.** WESTERN WOOD PEWEE.—New Culebra, Nov. 3, 1915. Female. Insects in stomach. On a trail.

***Myiochanes brachytarsus*.** SHORT-LEGGED WOOD PEWEE.—(a) New Culebra, Oct. 24, 1915. In a Cocoa plantation. (b) New Culebra, Nov. 3, 1915. Insects in stomach. On a trail. Small shrub berries in stomach. Shot after leaving the nest. The nest was about 8 feet from the ground, on an outer branch of a sparse-leaved, thorn tree, growing on the edge of the sand beach.

Myiozetetes cayennensis cayennensis. CAYENNE FLYCATCHER.—(a) Mindi, July 11, 1915. Female. On an open road. (b) New Culebra, Oct. 24, 1915. Female. Insects and seeds in stomach. In a Cocoa plantation.

Myiozetetes similis columbianus. COLOMBIAN FLYCATCHER.—(a) Gatun, Feb. 1, 1909. On a shrub in a clearing. (b) Gatun, April 26, 1909. Shot after leaving nest. The nest was on a tree on the extreme end of a lower limb, which extended over the water, and about 10 feet up from the surface. It was made of grass and lined with fine grass and the entrance was concealed with the grass tops. Two eggs, slightly pointed, with reddish-brown and purple spots, almost entirely on the larger end and one measured .89 by .66 inches. The spots on the eggs were somewhat larger than the Gray-capped Flycatcher. A nest of a Northern Elaenia was on the same limb. (c) On the Rio Algarrobo, May 30, 1915. In deep jungle. (d) New Culebra, Nov. 28, 1915. Small Diptera and Hymenoptera in stomach. This bird rested on a branch and frequently flew out quickly for passing insects. (e) In the valley of the Rio Velazquez, Feb. 13, 1916. Male. Small insects in stomach. In shrubbery. (f) Corozal, May 21, 1916. Insects in stomach. Shot from a flock while they were darting after insects in a drizzling rain.

Myiozetetes granadensis. GRAY-CAPPED FLYCATCHER.—(a) Gatun, April 4, 1909. One specimen. (b) Gatun, April 8, 1909. Shot near the nest.

Myiophobus fasciatus fufureus. BRAN-COLORED FLYCATCHER.—Farfan, Jan. 23, 1916. Female. Black Ants, 5/16 inch long, in stomach. In thick shrubbery.

Megarhynchus pitangua mexicanus. BOAT-BILLED FLYCATCHER.—(a) In the valley of the Rio Algarrobo, May 30, 1915. Female. Longicorn beetle, $\frac{3}{4}$ inch long, in stomach. In deep jungle. (b) In the valley of the Rio Algarrobo, May 30, 1915. Male. In deep jungle.

Tyrannus tyrannus. KINGBIRD.—(a) Gamboa, Oct. 15, 1915. One specimen. (b) Juan Diaz, Oct. 17, 1915. Male.

Tyrannus melancholicus satrapa. LICHTENSTEIN'S KINGBIRD.—(a) Gatun, Feb. 17, 1909. On the edge of a jungle, near a clearing. (b) In the valley of the Rio Algarrobo, July 4, 1915. Male. Small insects in stomach. In the jungle. (c) Taboguillo Island, Aug. 15, 1915. Seeds and small Coleoptera in stomach. In the forest. (d) Corozal, Aug. 29, 1915. Male. Small Coleoptera in stomach. (e) Corozal, Aug. 29, 1915. Female. Small Coleoptera and Odonata in stomach.

Manacus vitellinus. GOULD'S MANIKIN.—(a) In the valley of the Rio Algarrobo, May 30, 1915. In deep jungle. The bird makes a noise like the sharp cracking of a small stick. (b) In the valley of the Rio Algarrobo, July 4, 1915. Male. Small insects in stomach. In the jungle. (c) Gorgona, Feb. 20, 1916. Female. (d) In the valley of the Rio Velazquez, May 15, 1916. Female. Small berries in stomach. In a thicket. (e) Corozal, May 21, 1916. Male. In shrubbery.

Chiroxiphia lanceolata. SHARP-TAILED MANIKIN.—(a) Sosa Hill, Sept. 13, 1907. Shot on the nest. The nest was on a low bush, about 3 feet from the ground. It was a shallow mat of fine dried twigs and dried leaves hung loosely on the sides and bottom. Two eggs, brownish-white, with spots, of reddish-brown, mostly in a ring around the greatest width, and measured .86 by .62 and .86 by .60 inches. A similar nest was taken, about 4 feet from the ground, in a low bush, in the ruins of the Merced Convent Tower in Old Panama City, Aug. 11, 1907. It was a shallow mat of fibrous grass, bound with spider webs. Two eggs, brownish-white, with spots of reddish-brown, mostly in a ring around the greatest width, and measured .86 by .62 and .86 by .60 inches. (b) In the valley of the Rio Algarrobo, July 4, 1915. Male. Small seeds in stomach. In the jungle. (c) In the valley of the Rio Velazquez, May 2, 1916. Female. In the jungle. (d) Sosa Hill, May 23, 1916. Female. Small Coleoptera and other insects in stomach. In shrubbery.

Cotinga nattererii. NATTERER'S COTINGA.—Sosa Hill, Oct. 31, 1915. Male. Berries and small seeds in stomach. In shrubbery.

Tyrannulus elatus. RIKER'S YELLOW-CROWNED TYRANNULET.—Gorgona, Feb. 20, 1916. Male. Soft green seeds in stomach. In thick shrubbery.

Attila citreopygus citreopygus. SCLATER'S COTINGA.—Cruces Trail, near Corozal, Sept. 19, 1915. Female. Elateridae, $\frac{3}{4}$ inch long, and small Acridiidae in stomach.

Thamnophilus radiatus nigricristatus. BLACK-CROWNED ANT-SHRIKE.—(a) Mindi, July 11, 1915. Male. Hymenoptera, $\frac{5}{8}$ inch long, and small Coleoptera in stomach. In thick shrubbery. (b) Sosa Hill, July 18, 1915. Male. Insects in stomach. In the jungle. (c) Cruces Trail, near Corozal, Sept. 19, 1915. Insects in stomach. In thick shrubbery. (d) Sosa Hill, Sept. 26, 1915. Female. Small insects, a small Damsel Fly, and seeds, $\frac{1}{4}$ inch in diameter in stomach.

Thamnophilus atrinuchus. SLATY ANT-SHRIKE.—Gatun, Feb. 1, 1909. In the jungle near a creek.

Ramphocaenus rufiventris rufiventris. NORTHERN LONG-BILLED ANT-WREN.—Farfan, May 14, 1916. Female. Small seeds and small insects in stomach. In shrubbery.

Cercomacra nigricans. BLACK TYRANNINE ANT-BIRD.—Gorgona, Feb. 20, 1916. Male. Small insects in stomach. In thick shrubbery.

Xiphorhynchus nanus nanus. LAWRENCE'S WOOD-HEWER.—(a) Gatun, Feb. 2, 1909. Creeping around the trunks of trees in the jungle. (b) New Culebra, Nov. 3, 1915. Female. Insects in stomach. On a trail. (c) Juan Mina, Feb. 21, 1916. Male. Creeping up a branch.

Dendroplex picus (picrostris?). WHITE-THROATED WOOD-HEWER.—Near the mouth of the Rio Juan Diaz, Oct. 3, 1915. Male. Creeping up a dead branch. This observation extends the known range of this species, northward, into Central America.

Sittasomus sylvioides levis. PANAMA SITTASOMUS.—Near the mouth

of the Rio Juan Diaz, Oct. 17, 1915. Insects in stomach. Creeping on the trunks of trees in the jungle.

Zarhynchus wagleri. WAGLER'S OROPENDOLA.—(a) Tiger Hill, Jan. 24, 1909. Near the top of a large tree in the jungle, tearing decayed limbs apart. The call of this bird was like rolling stones in the rapids of a small brook and on the wing they made a noise like rapid, light beating on a loose drum-head. (b) New Culebra, Mar. 21, 1915. Four specimens were shot from a flock of about 12, in the tree tops, in a Cocoa plantation. They had a variety of loud, rancorous calls and yodels. (1) Male. Small Coleoptera in stomach. (2) Male. Small Coleoptera and Spiders in stomach. (3) Male. Two Scorpions, one, 2 inches long, and the other, 3 inches long, in stomach. (4) Female. Small Coleoptera and Hemiptera and the larvae of Lepidoptera in stomach.

Amblycercus holosericeus. PREVOST'S CACIQUE.—(a) Gatun, April 22, 1909. Insects in stomach. (b) Gatun, April 24, 1909. Insects in stomach. Shot on the nest. The nest was in a crotch of a limb on a sparsely-leaved shrub, in the jungle, about 8 feet from the ground. It was closely woven with heavy grass and light twigs and thickly lined with finer grass, with a cavity, $3\frac{1}{4}$ inches in diameter and 2 inches deep. Two eggs, light blue, sparsely spotted with black, denser at the larger end. (c) Farfan, Jan. 23, 1916. (d) Farfan, May 14, 1916.

Cacicus vitellinus. LAWRENCE'S CACIQUE.—(a) Tiger Hill, Jan. 24, 1909. In a tree top, in the jungle, tearing decayed limbs apart. (b) In the valley of the Rio Algarrobo, May 30, 1915. Male. Four beans, $\frac{1}{2}$ inch long, in stomach. (c) In the valley of the Rio Caimitillo, Oct. 20, 1915. Male.

Cacicus microrhynchus. SMALL-BILLED CACIQUE.—Tiger Hill, Mar. 21, 1909. In shrubbery.

Megaquiscalus major macrourus. GREAT-TAILED GRACKLE.—(a) Venado Island, Mar. 24, 1915. Female. Small Hermit Crabs and small shell fish in stomach. Perched in a tree. (b) Balboa, April 25, 1915. Female. In a Mango tree, in a mound, in a Mangrove swamp. (c) Balboa, Feb. 13, 1916. Female. In a flock of eight, feeding at a sewer mouth, on the mud beach.

Icterus giraudi. GIRAUD'S ORIOLE.—(a) Farfan, May 16, 1915. Male. Small Coleoptera in stomach. In shrubbery. (b) Balboa, May 15, 1916. Female. Small insects in stomach. In a tree in a clearing.

Leistes militaris. RED-BREASTED BLACKBIRD.—Casa Largo, May 31, 1914. Male. Grass seeds in stomach. In a flock, of about 20, on the open sabannas.

Cyanerpes cyaneus. BLUE HONEY-CREEPER.—(a) Farfan, June 20, 1915. Male. Red mass surrounding the seeds of the Balsam fruit in stomach and one Balsam seed in the mouth. In a clump of shrubbery. (b) Farfan, June 20, 1915. Male. In a clump of shrubbery in a clearing. (c) In the valley of the Rio Algarrobo, July 4, 1915. Small seeds in stomach. In a clearing. (d) Sosa Hill, Oct. 31, 1915. Male. Small hard seeds in stomach. On a Mango tree in a clearing.

Astragalinus psaltria colombianus. CENTRAL AMERICAN GOLD-FINCH.—In the valley of the Rio Algarrobo, July 4, 1915. Small seeds in stomach. In the jungle.

Arremonops conirostris. LAFRESNAYE'S SPARROW.—(a) Sosa Hill, May 20, 1914. Female. Seeds in stomach. (b) Farfan, June 20, 1915. In a shrub in a clearing. (c) Mindi, July 11, 1915. Male. On an open road. (d) Farfan, Feb. 6, 1916. Female. Berries in stomach.

Volatinia jacarini splendens. BLUE-BLACK GRASSQUIT.—(a) In the valley of the Rio Algarrobo, June 6, 1915. Small insects in stomach. In the jungle. (b) Balboa, June 24, 1915. Small seeds in stomach. In tall grass in a clearing. (c) Balboa, June 25, 1915. Male. Small seeds in stomach. In tall grass in a clearing. (d) Balboa, June 25, 1915. Male. Small seeds in stomach. In tall grass in a clearing. (e) Balboa, June 27, 1915. Male. Small seeds in stomach. In tall grass in a clearing. This bird would perch on a twig and, after short intervals, would jump up vertically, about a foot, and alight again in the same place, uttering a few short notes during the jump. (f) Balboa, Dec. 25, 1915. In an open grass plot.

Euthia olivacea pusilla. MEXICAN GRASSQUIT.—Cruces Trail, near Corozal, Sept. 5, 1915. Male. Small seeds in stomach. Several small flocks were seen in the thickets.

Sporophila minuta minuta. MINUTE SEED-EATER.—(a) Balboa, June 20, 1915. Male. Small seeds in stomach. In tall grass in a clearing. (b) Balboa, June 25, 1915. Female. Small seeds in stomach. In tall grass in a clearing.

Sporophila aurita. HICK'S SEED-EATER.—(a) Mindi, July 11, 1915. Male. Small seeds in stomach. In grass along an open road. (b) Cruces Trail, near Corozal, Sept. 5, 1915. Male. Small seeds in stomach. (c) Sosa Hill, Sept. 26, 1915. Male. Small white, soft seeds in stomach. In a small clearing. (d) New Culebra, Nov. 3, 1915. Along an open trail. Farfan, May 14, 1916. Male. Small seeds and berries in stomach. In shrubbery.

Oryzoborus funereus. LESSER RICE GROSBEAK.—Gatun, April 11, 1909. Shot while leaving nest. The nest was on a small shrub, about 2 feet from the ground, closely concealed in the leaves. It was made of fine roots and grasses, thinly woven. Three eggs, grayish-white, with brown spots and one measured .65 by .52 inches.

Cyanocompsa concreta cyanoides. PANAMA BLUE GROSBEAK.—In the valley of the Rio Velazquez, May 2, 1916. Male. Seeds in stomach. In the jungle.

Saltator albicollis isthmicus. PANAMA STRIPED SALTATOR.—(a) Las Cascadas, May 10, 1908. Shot on the nest. The nest was on a small shrub, about 6 feet from the ground, in the jungle on the edge of a small clearing. It was made of sticks, twigs, and bark and the cavity was about 2½ inches in diameter. Two eggs, blue, with a few lines near the larger end and measured 1.01 by .73 and .97 by .72 inches. (b) Gatun, April 7,

1909. Shot while leaving the nest. The nest was on a thorn tree, about 12 feet from the ground, on the edge of a clearing. It was made of dried grass, twigs, leaves, bark, and tendrils, with an outside diameter of about 4 inches. Two eggs, blue, with a few lines near the larger end and measured 1.01 by .66 and .97 by .69 inches. (c) Farfan, June 20, 1915. Female. The red mass, surrounding the seeds of the Balsam fruit, in stomach. In a shrub in a clearing. (d) Gamboa, Oct. 15, 1915. Male. Small seeds in stomach. (e) Farfan, Jan. 23, 1916. Male. Small fruit and seeds in stomach. In thick shrubbery. (f) Farfan, May 11, 1916. Male. Small berries in stomach. In shrubbery.

Saltator atriceps lacertosus. PANAMA BLACK-HEADED SALTATOR.—New Culebra, Nov. 21, 1915. Male. Buds in stomach. On an open trail.

Saltator magnoides intermedius. PANAMA BUFF-THROATED SALTATOR.—(a) Gatun, April 1, 1909. Shot while leaving the nest. The nest was on a bush, about 4 feet from the ground, in a meadow of tall, rank grass. It was made of dried grass, grass roots and leaves, and lined with dried tendrils, with an outside diameter of about 6 inches. Two eggs, spotted with a few black spots, and one measured .98 by .70 inches. (b) New Culebra, Nov. 28, 1915. Female. Black Ants and a pebble, $\frac{1}{8}$ inch in diameter, in stomach. On an open trail. (c) Gorgona, Feb. 20, 1916. Male. In shrubbery.

Tangara inornata. PLAIN TANAGER.—New Culebra, Nov. 3, 1915. Female. Small fruit seeds in stomach. On an open trail.

Tangara lavinia. LAVINIA'S TANAGER.—(a) New Culebra, Nov. 3, 1915. Male. Soft berries in stomach. On an open trail. (b) New Culebra, Nov. 21, 1915. Male. Small, green, shrub berries in stomach. On an open trail.

Thraupis cana. BLUE TANAGER.—(a) Gatun, April 13, 1909. Two specimens shot near the nest. The nest was on a branch of a tree, about 15 feet from the ground. It was made of leaves and dried grass. Two eggs, grayish-white, very thickly marked with brown, denser towards the larger end, and one measured .84 by .67 inches. (b) Gatun, May 6, 1909. Small grass seeds in stomach. Shot after leaving the nest. The nest was 30 feet from the ground. It was made of grass, flat rush leaves, and cotton waste, cup-shaped, closely woven, and lined with flat rush leaves. Two eggs, grayish-white, very thickly marked with brown, denser towards the larger end, and one measured .97 by .66 inches. (c) Mindi, July 11, 1915. Male. Lepidoptera larva in its bill. On a sparse-limbed tree. (d) New Culebra, Nov. 3, 1915. On a trail. (e) Farfan, Feb. 6, 1916. Female. Small shrub berries in stomach. In a tree. (f) Farfan, Feb. 6, 1916. Male. In a tree.

Piranga rubra rubra. SUMMER TANAGER.—In the valley of the Rio Caimitillo, Oct. 21, 1915. New Culebra, Oct. 24, 1915. Three males. Small Hymenoptera and Diptera in stomachs. In a Cocoa plantation.

Tachyphonus rufus. BODDAERT'S TANAGER.—(a) Gatun, Feb. 5, 1909.

Two specimens. On the edge of the jungle in a creek bottom. (b) Gatun, April 22, 1909. Small insects in stomach. (c) New Culebra, Oct. 24, 1915. Female. Insects in stomach. In a Cocoa plantation. (d) New Culebra, Nov. 3, 1915. Male. Small Spiders, small Coleoptera, and soft fruit matter in stomach. In a Cocoa plantation. (e) New Culebra, Nov. 3, 1915. Female. Fragments of fruit and Ants, $\frac{1}{4}$ inch long, in stomach. In Cocoa plantation. (f) New Culebra, Nov. 3, 1915. Female. Small Coleoptera and other small insects, in stomach. On a trail. (g) Las Guacas, Nov. 28, 1915. Male. Ants and small Coleoptera in stomach. In a cultivated plantation. (h) Juan Mina, Feb. 21, 1916. Male. Small seeds in stomach.

Rhamphocelus dimidiatus. CRIMSON-BACKED TANAGER.—(a) Las Cascadas, May 24, 1908. Shot after leaving the nest. The nest was on a shrub, about 6 feet from the ground, in the jungle. It was made of twigs, roots, bits of bark, with dried leaves on the outside and the cavity was about 3 inches in diameter. Two eggs, light blue, with a few black spots and tangled lines on the larger end. A similar nest at Las Cascadas, May 10, 1908, was on a limb, about 5 feet from the ground, in the jungle, near a clearing. Four eggs, light blue, with a few black spots and tangled lines on the larger end, and two measured .97 by .65 and .96 by .65 inches. (b) Gatun, Feb. 1, 1909. One specimen in a clump of shrubbery in a clearing. Farfan, May 23, 1915. Female. Seeds, like Cucumber, in stomach. In the jungle. (c) In the valley of the Rio Algarrobo, June 6, 1915. Male. Small larvae and grass seeds in stomach. In deep jungle. (d) In the valley of the Rio Algarrobo, July 4, 1915. Female. Small seeds in stomach. In the jungle. (e) In the valley of the Rio Algarrobo, July 4, 1915. Male. In the jungle. (f) Juan Mina, Feb. 21, 1916. Male. Soft seeds and Lepidoptera larvae in stomach. In a flock in an Orange grove. (g) Juan Mina, Feb. 21, 1916. Female. Small hard seeds in stomach.

Phoenicothera fuscicauda. DUSKY-TAILED ANT TANAGER.—(a) Gatun, Feb. 3, 1909. In the jungle near a stream. (b) In the valley of the Rio Algarrobo, May 30, 1915. Female. Soft seeds, $\frac{1}{4}$ inch long, and grass seeds in stomach. In the deep jungle. (c) Farfan, May 9, 1915. Fragments of Coleoptera, about $\frac{1}{2}$ inch long, in the neck. In the jungle. This bird makes a low, harsh, scratching note. (d) In the valley of the Rio Algarrobo, May 30, 1915. Two males. In deep jungle. (e) In the valley of the Rio Algarrobo, June 6, 1915. In deep jungle. (f) In the valley of the Rio Algarrobo, July 4, 1915. Male. Insects in stomach. In deep jungle. (g) In the valley of the Rio Velazquez, May 15, 1916. Female. Small berries and small insects in stomach. In the jungle. Under the right wing a Dipterous larva, about $\frac{1}{2}$ inch long and about $\frac{1}{4}$ inch in diameter, was eating under the skin and the larva pupated when the bird was put on ice.

Progne chalybea chalybea. GREY-BREASTED MARTIN.—(a) Farfan, Mar. 21, 1915. Female. Small Diptera and Hymenoptera in stomach.

In a flock of several flying swiftly over the sand beach and the nearby jungle. One of the flock rested a few moments on the sand beach. (b) Darien Radio Station, Dec. 12, 1915. Male. Small Odonata, Coleoptera, Diptera and Hymenoptera in stomach. On a high dead tree in Gatun Lake. The flock was skimming over the surface of the water for food. (c) Balboa, May 21, 1916. Male. Insects in stomach. Resting on a power wire in the rain.

***Hirundo erythrogastra*.** BARN SWALLOW.—(a) Gatun, Nov. 22, 1908. Wounded after flying against a wire screen. (b) La Boca, Nov. 14, 1915. Three specimens. Insects in stomachs. In a large flock, flying in the evening, over a clearing.

***Vireosylva flavoviridis flavoviridis*.** YELLOW-GREEN VIREO.—(a) Juan Mina, Feb. 21, 1916. Male. Small shrub seeds in stomach. In a small flock in an Orange grove. (b) Balboa, May 13, 1916. Male. Small insects in stomach. On the edge of a Mangrove swamp. (c) Corozal, May 21, 1916. Male. Seeds, $\frac{1}{8}$ inch in diameter, in stomach.

***Lanius flavifrons*.** YELLOW-THROATED VIREO.—New Culebra, Nov. 3, 1915. Female. Small green berries, $\frac{1}{8}$ inch in diameter, and small white seeds in stomach. On a trail.

***Pachysylvia aurantifrons aurantifrons*.** LAWRENCE'S VIREO.—In the valley of the Rio Velazquez, Feb. 13, 1916. Male. Small seeds and small insects in stomach. In shrubbery.

***Pachysylvia viridiflava*.** YELLOW-GREEN PACHYSYLVIA.—Corozal, May 21, 1916. Male. Hard seeds, $\frac{1}{8}$ inch in diameter, in stomach. In shrubbery.

***Protonotaria citrea*.** PROTHONOTARY WARBLER.—Sosa Hill, Oct. 31, 1915. Small seeds, insects and two small Lepidoptera larvae in stomach. In shrubbery.

***Vermivora peregrina*.** TENNESSEE WARBLER.—New Culebra, Oct. 24, 1915. Male. In a Cocoa plantation.

***Dendroica aestiva*.** YELLOW WARBLER.—(a) Balboa, Aug. 17, 1915. One specimen. (b) Cruces Trail, near Corozal, Sept. 5, 1915. Female. Small Coleoptera in stomach.

***Dendroica erithachorides*.** PANAMA YELLOW WARBLER.—(a) Corozal, Mar. 12, 1915. Female. Small Coleoptera in stomach. In a Mangrove swamp. (b) Corozal, Mar. 12, 1915. In a Mangrove swamp. (c) Cruces Trail, near Corozal, Sept. 5, 1915. (d) Balboa, Dec. 25, 1915. Male. In an open grass plot. (e) Gorgona, Feb. 20, 1916. Female. Insects in stomach. In shrubbery. (f) Balboa, May 13, 1916. Male. Insects in stomach. On the edge of a swamp.

***Dendroica pensylvanica*.** CHESTNUT-SIDED WARBLER.—New Culebra, Oct. 24, 1915. Female. Small insects and one Lepidoptera larva, 1 inch long, in stomach. In a Cocoa plantation.

***Dendroica castanea*.** BAY-BREASTED WARBLER.—New Culebra, Nov. 3, 1915. Male. Small seeds in stomach. On a trail.

***Basileuterus rufifrons mesochrysus*.** SCLATER'S WARBLER.—(a) In

the valley of the Rio Algarrobo, June 6, 1915. Male. Small insects in stomach. In deep jungle. (b) Sosa Hill, July 18, 1915. Male. Insects in stomach. (c) Sosa Hill, Sept. 26, 1915. Female. Small insects in stomach. (d) Farfan, May 14, 1916. Male. In the muscular tissue there were white worms, about $\frac{1}{8}$ inch long.

Troglodytes musculus inquietus. PANAMA HOUSE WREN.—(a) Las Cascadas, May 22, 1908. On the nest. The nest was under the eave of a house, on the top of a column, about 10 feet from the ground. It was made of sticks, grasses, roots, feathers, bits of tin and wire nails. The opening was well concealed. Three eggs. (b) Corozal, June 12, 1914. In a house. There were several around the house at all times.

Henicorhina prosthaleuca pittieri. PITTIER'S WOOD WREN.—In the valley of the Rio Velazquez, May 15, 1916. Male. Insects in stomach. In a thicket in the jungle.

Phlegopedius hyperythrus. TAWNY-BELLIED WREN.—In the valley of the Rio Algarrobo, July 4, 1915. Male. In the jungle.

Thryophilus rufalbus castanonotus. CHESTNUT-BACKED WREN.—Sosa Hill, July 18, 1915. Male. Insects in stomach. In a small clearing.

Thryophilus modestus elutus. PANAMA WREN.—(a) Sosa Hill, July 18, 1915. Male. (b) Sosa Hill, Oct. 31, 1915. Male. Small Coleoptera and Hemiptera in stomach. In shrubbery. (c) Farfan, Jan. 23, 1916. Male. Insects in stomach. In thick shrubbery. (d) Gorgona, Feb. 20, 1916. Female. Insects in stomach.

Rhodinocichla rosea. ROSE-BREADED MOCKING-THRUSH.—Gorgona, Feb. 20, 1916. One male and one female. Hard shrub seeds in stomachs. In thick shrubbery.

Planesticus grayi casius. BONAPARTE'S THRUSH.—(a) Las Cascadas, May 10, 1908. On the nest. The nest was about 25 feet from the ground, in a tree near a clearing in the jungle. It was made of fibrous roots and tendrils. Three eggs, very light green, nearly evenly spotted with reddish-brown. A similar nest taken in the same locality, May 22, 1908, was made of fibrous roots and tendrils but with no mud lining. Three eggs, very light green, but not so thickly marked, and two measured 1.08 by .79 and 1.09 by .80 inches. (b) Gatun, Mar. 27, 1909. Near the nest in a small grove of thorn trees. The nest was in a crotch of a thorn tree, about 40 feet from the ground and had an outside diameter of about 4 inches with thin walls made of fibrous roots and tendrils and lined with mud. Two eggs, very light green, spotted nearly evenly with reddish-brown and measured 1.27 by .82 and 1.34 by .81 inches. (c) Gatun, April 5, 1909. Two specimens shot after leaving the nest, in the evening. The nest was about 4 feet from the ground, in a crotch of a big-limbed, low shrub, in a clearing near a creek. It was made of small roots, woven in mud, and lined with roots. Three eggs, very light green, spotted densely and uniformly with reddish-brown and measured .97 by .78, 1.03 by .80 and 1.04 by .80 inches. (d) Gatun, May 5, 1909. Small berries in stomach. Shot after leaving nest. The nest was in a small thorn tree, about 15 feet from the ground. It

was made of roots and moss and lined with smaller roots. Two eggs, very light green, spotted nearly evenly with reddish-brown. One egg was very irregular in shape and the other measured 1.24 by .76 inches. (e) In the valley of the Rio Algarrobo, May 30, 1915. Female. One green berry in stomach. In deep jungle. (f) In the valley of the Rio Algarrobo, May 30, 1915. Female. In deep jungle. (g) Sosa Hill, May 7, 1914. Female. Shot after leaving the nest. The nest was about 10 feet from the ground.

212 Madison Ave., Paterson, N. J.

A NEW BUSH-WARBLER FROM THE FRENCH CONGO.

BY J. H. RILEY.¹

MR. C. R. ASCHEMEIER, of the staff of taxidermists in the United States National Museum, who accompanied the Collins-Garner Congo Expedition of 1916-1919, made large collections of natural history material in the vicinity of Fernan Vaz, the headquarters of the expedition.

In determining the birds collected on this expedition, all of which came to the National Museum, I found a specimen of *Macrosphenus* that did not agree with any of the described forms as worked out by Bannerman² and which was laid aside as being possibly undescribed. Mr. James P. Chapin, whose knowledge of West African birds is unsurpassed, was recently shown this specimen and he has confirmed my suspicions and urged me to describe it at the earliest opportunity.

I take great pleasure in dedicating the new species to Major Alfred M. Collins, whose generosity made the expedition possible.

Macrosphenus collinsi, sp. nov.

Type, adult female, U. S. National Museum, No. 255,620, Ogouma, French Congo, November 29, 1918, collected by C. R. Aschemeier (original No. 900).

Similar to *Macrosphenus flavicans flavicans* Cassin, but considerably smaller, more yellowish green above, throat whitish, not neutral gray, gray of chest more extensive, yellow of breast and belly more greenish

¹ By permission of the Secretary of the Smithsonian Institution.

² *Ibis*, 1921, pp. 121-125.

and not extending so far forwards, feathers of the alula rather broadly tipped with white, and there are other minor differences.

Description.—Above warbler green; an indistinct loral streak yellowish citrine; small chin spot picric yellow; throat pale gull gray with a few yellowish streaks; chest and upper breast pale neutral gray, streaked sparingly with yellow; lower breast, belly, under tail-coverts and flanks, pyrite yellow or a little brighter; rump feathers very full, like the back in color with rather broad lemon yellow tips; tail saccardo olive; wings chaetura drab, the feathers edged outwardly with the color of the back or slightly darker; the innermost remiges saccardo olive; two feathers of the alula rather broadly tipped with white, forming a conspicuous mark. Wing, 50; tail, 24; culmen, 17; tarsus, 19; middle-toe, 9.5 mm.

Remarks.—The specimen of *Macrosphenus flavicans flavicans* used for comparison is from the River Ja, Cameroon. It measures as follows: wing, 60.5; tail, 45.5; culmen, 19; tarsus, 20.5; middle-toe, 11 mm. The scapular and rump feathers on the River Ja specimen are conspicuously pinkish buff basally, while in *Macrosphenus collinsi* they are yellowish and hardly noticeable. It seems strange that a second species of *Macrosphenus*, so closely resembling *M. flavicans*, except in size and minor details, should come from practically the type locality of the latter.

U. S. National Museum.

FURTHER OBSERVATIONS ON THE GROUP HABIT AMONG BIRDS.

BY CHARLES L. WHITTLE AND LAURENCE B. FLETCHER.

As this paper will have to do largely with ornithological observations made at four bird-banding stations in Cohasset, Mass., a word regarding them is necessary for the sake of clearness and facility of reference.

Roughly speaking, the four stations are one mile apart and they are so located as to form very nearly the capital letter L. They will be referred to as A, B, C and D. Station A is L. B. Fletcher's and was established in 1921. It is located at the free end of the bottom line of the L. Station B, now one year and five months old, is operated by C. L. Whittle and is located at the intersection of the bottom line and the perpendicular. Station C is approximately half-way between B and the free end of the perpendicular and has been operated by Conover Fitch since the fall of 1923.

At the top of the L (D) is Mr. and Mrs. Richard B. Harding's station which was established in 1922. Stations A and D in a straight line are about two and one-half miles apart.

Between October 1, 1922 and April 17, 1923, there were trapped and banded at Station A a total of fifty-seven Slate-colored Juncos (*Junco h. hyemalis*). Of these, twenty-three were banded on January 25, 1923, three were banded prior to this date, and thirty-one were banded after this date. The number of traps, their kind, and location were the same throughout the period—a pull-string and two automatics (a Dodson and a Government sparrow-trap).

For several months just previous to January 25, 1923, Juncos were extremely scarce about this station. The winter of 1922-23 was of great severity all over New England, both as regards average temperature and in the matter of numerous and heavy snowfalls, the ground remaining snow-covered continuously with a few days' exception.

On the night of January 23 the temperature in Cohasset reached a minimum of seven degrees above zero, but by the 25th of the month the weather had moderated and a snow storm was in progress, the wind being very light. Bird-wise, a radical change suddenly took place on the morning of the 25th. At 8:30 A. M. Juncos in quantity flocked to Station A and began entering an automatic trap, and by 3 P. M. the twenty-three Juncos taken on this date were trapped and banded, all but four entering the trap by 11:30 A. M. Of these twenty-three birds, eight repeated once before all the Juncos left Cohasset in April for their nesting grounds and three repeated several times.

The fall of 1923 and the early part of January 1924 were characterized by an abnormally high average temperature and the snowfall was extremely small, both in Cohasset and throughout Massachusetts and southern and central New Hampshire and Vermont. In fact bare ground obtained practically all the time during this period in the region in question so that ground-feeding birds had little incentive to leave much of their nesting area either to escape low temperatures or deep snows, or to search for productive feeding areas, and this condition existed up to January 26 when snowy conditions set in, followed by cold weather on

the 27th, which continued with little interruption until February 24th.

Juncos at Station A appeared with some steadiness, but in limited numbers, from October 21, 1923 to February 3, 1924, thirty-one being banded during this time, averaging about one bird every three days, but on February 4, following low temperatures in Cohasset and throughout New England, conditions at this station again suddenly changed. By 11:30 twelve Juncos not previously seen, at least about the station, during the winter of 1923-24, were taken together from an automatic trap, the birds having entered the trap between 10 A. M. and 11:30 A. M. Of these twelve birds, three were unbanded and nine were returns,¹ and of these nine returns, six were banded on January 25, 1923! Six days later, on February 10, four of these six Junco returns were again retaken at the same time in the automatic trap in which they were trapped on February 4. Ordinarily birds retaken so soon are known as repeats, but, as they were in addition returns of six days standing, it seems desirable to speak of them as return-repeats. In order that the records of these nine returns and the four return-repeats may be easily consulted, we have prepared the following table which also includes the additional Junco returns for the winter of 1923-24 taken at this station, fourteen in all.²

DETAILS OF FOURTEEN JUNCO RETURNS TO SHOW GROUP
RELATIONS.³

No.	Date of Banding (1923)	Time	Date of Return (1924)	Time
75429	Jan. 10	4:15 P. M.	Jan. 5	4:00 P. M.
75431*	" 25	8:30 A. M.	Feb. 4	11:30 A. M.
75433*	" "	9:00 A. M.	" 4	11:30 A. M.
75434*	" "	9:00 A. M.	" 4	11:30 A. M.

¹ For convenience in keeping our station records, we are restricting the use of the word "return" to birds which, banded at one station, are retaken at the same station after having returned from an annual migration or migrations for the first time.

² An additional Junco return, the fifteenth, No. 35809 occurred February 28, 1924, after this article went to press.

³ Those birds having a single star opposite their number were banded on the same day and returned the same day over a year later as a group. Those having double stars were not banded on January 25, but returned with those having a single star. Those having triple stars are one-star birds taken again six days later as a group.

No.	Date of Banding (1923)		Date of Return (1924)	
		Time		Time
75435*	" "	9:30 A. M.	" 4	11:30 A. M.
75438	" "	9:30 A. M.	Feb. 12	
75439*	" "	9:30 A. M.	" 4	11:30 A. M.
75444*	" "	11:00 A. M.	" 4	11:30 A. M.
75445	" "	11:00 A. M.	Nov. 17 (1923)	2:00 P. M.
104509	" 26	8:15 A. M.	Jan. 6	4:30 P. M.
35808**	Feb. 7	5:00 P. M.	Feb. 4	11:30 A. M.
35811**	" 10	8:30 A. M.	" 4	11:30 A. M.
35814**	" "	1:00 P. M.	" 4	11:30 A. M.
35821	" 14	7:30 A. M.	Jan. 6	4:20 P. M.

On February 10, 1924, return-repeats were:

75431***	3 P. M.	These birds entered trap within a period of 15 minutes and were taken together.
75434***	3 P. M.	
75439***	3 P. M.	
75444***	3 P. M.	

The first appearance of these Juncos and others, coming as they did shortly after a general snowfall over New England, the first snow of any importance up to this time during the winter, is believed to have been due to a southward movement from a region which until about that time had been free from snow or nearly so.

Having the above general observations and the remarkable banding records in mind, what is their significance, noting first in particular the striking fact that a number of Juncos, at least six, were banded on the same day in January, 1923 and were re-taken together over a year later on the same day? Shortly after the birds were banded all of this species at Station A migrated to their more northern nesting grounds where all trace of them was lost until they again appeared suddenly the next winter at Station A and entered the same trap within one and one half hours of one another. That this coming as a group was not fortuitous is shown by the fact that after a lapse of six days four of the same six birds, or 66 per cent, again were taken together in the same trap. It would be difficult to obtain more competent testimony of the existence of the group habit among birds of this species, at least while in their winter quarters, a habit, in this instance, which has endured for two successive winters.

The facts submitted in addition have a bearing, and this an important one, (1) on the manner the individuals of such a group

migrate; and (2) on the question of how the members keep track of one another during the nesting season. In 'The Auk', Vol. XXXVIII, pp. 236 and 237, Baldwin has written of his wintering group of White-throated Sparrows (*Zonotrichia albicollis*) near Thomasville, Georgia, which he refers to as a "neighborhood group," birds which winter in the same spot year after year. Baldwin believes such groups migrate north as a unit and return to winter quarters as a unit, and he raises the question if they do not also nest as a group. For a discussion of the latter phase of the matter, see reference below, based in part on the occurrence of albinistic Sharp-tailed Sparrows (*Passerherbulus caudacutus*) for twenty-two successive seasons at their winter quarters at the same spot in South Carolina.¹

The case of the Juncos greatly increases the presumption that the integrity of a wintering group of this species is not wholly lost during the nesting season. This view is supported by the evidence furnished by the mere existence of the same migratory birds in a group for two successive winter seasons, and by the manner these birds first appeared at Station A and reappeared there one year and ten days afterwards. The evidence does not indicate, either in 1923 or 1924, that straggling Juncos from widely-separated nesting places accidentally assembled at this banding station in January, 1923, only to disperse in the spring and then accidentally to reassemble there on a particular date and at a closely similar hour. Rather, to us it appears that the birds came to their winter quarters in a group, a habit hardly possible unless their nesting grounds were related in such a manner that the coming together of the birds at the close of the nesting season was easy and customary. That groups of uncolonizing birds nest in close proximity to one another was shown near Hillsboro, N. H., one day in June during the height of the nesting season. Here, within an area of perhaps twenty-five acres, more than a half dozen Whitethroats were in full song, and there is little doubt that they were nesting birds.

The case of these Juncos furnishes us with no evidence as to the makeup of the group, whether of one family, or parts of several

¹ "Some Aspects of the Group Habit Among Birds," By C. L. Whittle. 'The Auk,' Vol. XL, pp. 224-240.

families; whether an organized or an unorganized relationship. Bird-banding, however, has enabled Jack Miner, at his station in Kingsville, Ontario, to prove not only the existence of a migrating family of Canada Geese (*Branta c. canadensis*) but that this family group migrated to their winter quarters from their nesting grounds by way of his station and back to their nesting grounds by way of his station. The family consisted of father and mother and four young-of-the-year.¹ This example of a family group is probably not an exceptional one among this species and the custom is likely also to exist with other members of the Anatidae. It is well known to be a habit with the Bob-white (*Colinus v. virginianus*) and the Ruffed Grouse (*Bonasa u. umbellus*).

It is interesting to note that the habit of families remaining together through the fall and winter is not unusual among some of our less generalized, non-migratory species, and is, therefore, to be regarded as a primitive custom. The problem however of analyzing the organization of migratory groups, such as Juncos, is beset with difficulties, but it may be solved perhaps in time by banding families of nestlings together with their parents. A case in point is the partially migratory Chickadee (*Penthestes a. atricapillus*) that in winter time travel about commonly in little groups of six to eight individuals, which in number agree fairly well with a theoretical estimate of the size of the average surviving family of this species during the first winter. At station B, during the present winter, sixteen Chickadees, all banded, have been regular daily visitants. They usually come to the station in two groups of eight birds each, commonly alighting first in the tree tops nearby and then dropping to the traps. It is obvious that the habits of this species lend themselves to prompt and accurate analysis of the makeup of such groups as these which we believe to be of the family order.

The four Cohasset stations on account of their number and special relations are beginning to yield data regarding certain wintering species which we did not anticipate. These species are the Junco, the American Goldfinch (*Astragalinus t. tristis*) and the Purple Finch (*Carpodacus p. purpureus*).

The observations indicating, if not proving, the group habit

¹ 'Jack Miner and the Birds,' by Jack Miner. pp. 118-122.

among the Juncos, yield also other information of interest. At Station A fifty-seven of this species were banded during the winter of 1922-23, and up to February 23, 1924 there were fourteen returns, or 24.56 per cent,¹ showing a pronounced tendency to re-visit or to rewinter in the same area as during the previous winter, and also to return to the exact spot where they were banded. If we could know the number of fatalities among the fifty-seven birds after leaving the station in the spring of 1923, the percentage of returns, based on the remaining living birds, would undoubtedly be greatly increased. At station B the Junco returns for the same period were 14.92 per cent.

It is also of interest to note that up to February 23, 1924, no Juncos, banded at Stations A or B during the winter of 1922-23, were taken during the following winter season at any other banding station in Cohasset, and that we have but one case in this town of a bird of this species visiting another station at any time. Contrast this behaviour with the erratic wanderings of our Goldfinches and Purple Finches. Of the latter species the returns thus far have been almost negligible, whereas recoveries² between stations during the same winter season, or after an absence of months, are not infrequent. In the case of the Goldfinches we have had little opportunity to secure comparable data in all respects for the reason that previous to the present winter very few of this species were banded in Cohasset. During the present winter, however, Goldfinches are being banded plentifully at Stations B, C and D, and recoveries of one another's birds are matters of nearly every-day occurrence.

Thus far we have detected no evidence of fixed groups among the Purple Finches, and little evidence of a tendency to return to the same wintering place year after year. At this season both species roam at large in separate flocks, which seem to know no law, over their chosen territory, the makeup of the flocks being inconstant, even for a day, both as to the number of birds and the individuals composing them.

King Street, Cohasset, Mass.

¹ As stated above the record on February 28, 1924, amounted to fifteen returns or 26.31 percent.

² For convenience in keeping our personal records, we make a distinction between birds banded at one station and captured at another station or place, and those captured at the same place they were banded, and these records are filed under a master card marked "Recoveries."

A NEW SUBSPECIES OF *NOTHOPROCTA* FROM CHILE.

BY H. B. CONOVER.

DURING a hasty examination of a series of game birds recently collected in Chile and Argentina, the fact that there are two distinct races of *Nothoprocta perdicaria* inhabiting the Central Provinces of Chile became very evident. On looking further into the matter, I found that three names have been given to Chilean Tinamous of this genus, but that all three undoubtedly refer to the northern form, which leaves the southern one unnamed. Therefore I propose for the southern form the following:

***Nothoprocta perdicaria sanborni* subsp. nov.**

Type from Mafil (20 miles southeast of the city of Valdivia), Province of Valdivia, Chile. Adult female in the Conover Collection, Field Museum of Natural History. Collected February 21, 1923 by C. C. Sanborn. Original number 217.

Characters.—Similar to *N. p. perdicaria*, but much darker with upper parts more brownish and under parts clay-color instead of gray. Bars on the outer webs of the secondaries argus brown instead of sayal brown.

Description.—Feathers of the pileum brownish black tipped with brown. Sides of face and neck whitish buff irregularly spotted with blackish brown. Feathers of the upper tail coverts, back, upper wing coverts and mantle brownish black broadly edged with grayish clay-color, and with two buffy white stripes between the dark central portion and the clay-colored edges. Dark central portion of each feather crossed with irregular lighter brown bars. Throat white; neck and upper breast clay-color with a slight grayish tinge; rest of under parts clay-color, darker on the sides and flanks, lightest on the abdomen. A few irregular dark brown bars on some of the feathers of the flanks and thighs. Primaries blackish brown with argus brown bars on the outer web. Under wing coverts brown barred with argus brown, the last two with argus brown bars indistinct. Wing 115 mm.; culmen from base, 29 mm.; tarsus, 385 mm.; middle toe with claw 36 mm.,

Remarks.—The three names given to the northern form are *N. perdicaria* (Kittledge), *N. coquimbica* (Salvadori), and *N. punctulata* (Des Murs). Of these *N. perdicaria* was the first and the type locality is Valparaiso. As typical specimens of this race I have examined two specimens from Limache, Province of Valparaiso, and six from the Banos de Cauquenes, Province of

Colchagua. These are gray-breasted birds and agree with the description of *N. perdicaria*.

The type locality of *N. coquimbica* is given in the original description (Cat. Birds Brit. Mus., v. 27, p. 554) as "Coquimbo, S. Chile." There is only one Coquimbo in Chile and it is located in the northern provinces, so "S. Chile" is doubtless an error. Three specimens have been examined from the Province of Coquimbo, one from Paiguana and two from Romero. These agree with Salvadori's description in being a clearer gray than specimens of typical *N. perdicaria*, but the difference is so slight that it would seem best to consider *N. coquimbica* (Salvadori) as a synonym of *N. perdicaria* (Kittledge).

N. punctulata (Des Murs) in the original description is said to inhabit the central province of Chile. Probably it came from the same region as *perdicaria* with which it is usually synonymized. The description reads "estomago y pecho de un gris violacelo, como el de ciertas palomas, punteado sobre cada pluma con una redondez blanquiza." This leads to the conclusion that the specimen described was the northern form *N. perdicaria*, as the southern bird has the abdomen and breast clay-colored or even darker.

After a recent stay in Chile of from four to five months I am convinced that there is only one species of *Nothoprocta* inhabiting the Central Provinces and that this species has two distinct races, *N. p. perdicaria* a northern form, ranging from Coquimbo south to the vicinity of Concepcion, where it intergrades with a southern form, *N. p. sanborni*, which ranges from Concepcion to Puerto Montt.

This Tinamou, which goes by the name of "Perdiz" in Chile, is a bird of the open country, living in the fields and on the brushy hillsides. In the northern part of its range, it lives from sea level to as high as 5000 feet in the foothills, but according to local hunters the birds living at the higher elevations come down to the valleys in the fall just before the hills become covered with snow. Farther south, where the country is well timbered, although much clearing has been done, the birds seem to stay around the fields and cut-over lands. While traveling on the train between Osorno and Puerto Montt, our party saw a number of birds flush from the railroad right of way, alighting again at the edge of the timber or

a hundred yards or so out in the fields. At Puerto Montt, "Perdiz" were rather scarce, and a few years before had been unknown, so it is probable that the birds are extending their range south as the country becomes more cleared. Perhaps before the coming of the Spaniard, when the country south of the Bio-Bio was entirely covered with timber, the range of this tinamou did not extend much south of this river.

This bird is very common in some parts, especially where promiscuous shooting is prohibited by the landowners, many of whom prohibit shooting on their ranches. Nevertheless during the shooting season many of these birds find their way to the markets. The market at Santiago especially is always full of them, where they sell at about a peso each (about 12 cents American).

Young birds about a third grown were taken February 23, and a nest with eggs about ready to hatch was found at about the same date. Immature birds can be told by the feathers of the upper breast having dark blotches or bars.

As a game bird it offers rather good sport, flying at a good pace when flushed, but is inclined to run and sneak away instead of flying; however a good spaniel would have no trouble in flushing it up into the air. When it does flush it gets away smartly, uttering a shrill whistle of protest. The bird is always found singly, never in coveys, although sometimes several may be found in close proximity in some spot where there is an abundant supply of food, such as a small patch of grain stubble grown up with weeds. Crops of birds I shot contained wheat, corn, small seeds and grasshoppers. According to local hunters the birds also are very fond of the seed of the thistle and of small potatoes, and this was borne out by actual observation to the extent that birds were flushed from patches of thistles several times.

6 Scott St., Chicago, Ill.

GENERAL NOTES.

Black Tern near New York City in Spring.—On May 13, 1923, Dr. Ellsworth Eliot, Dr. E. R. P. Janvrin, Mr. J. M. Johnson and I made a long, all-day spring census in the Englewood region, Bergen County, New Jersey. We were fortunate in striking the biggest wave of migrants of the season and recorded 99 species, many in great abundance. The famous Overpeck Creek Marshes produced an unusual number of water-birds. A pair of very belated Mallards, some Black Ducks, seven species of Shore-birds, including the first inland record of the White-rumped Sandpiper for the State, and all five Swallows were welcome additions after ten hours in the field. Utterly unexpected, however, was the sight of two Black Terns in full breeding plumage hawking gracefully over the waters of the creek, at times passing very close to us. I was consequently much interested to learn from Mr. George E. Hix a few days later, that he saw two Black Terns in full breeding plumage at Long Beach, Long Island on May 16. The birds were tame, conditions were ideal, and this bird is, of course, practically unmistakable. There are only three previous spring records for the Black Tern in this region, all from Long Island. It is perhaps significant that two of these records were in 1921 and 1922 respectively, and it will be interesting to see whether spring records become more frequent and regular.—LUDLOW GRISCOM, *American Museum of Natural History, New York.*

A Specimen of Thayer's Gull from New Jersey.—A specimen of *Larus thayeri* in the collection of the Academy of Natural Sciences was taken by Mr. Samuel N. Rhoads at Mt. Ephraim, N. J. near the Delaware River, March 9, 1888. It had long passed as a Herring Gull until a recent examination of the specimens of this species by Dr. H. C. Oberholser brought out its true relationship.—WITMER STONE, *Academy of Natural Sciences of Philadelphia.*

A Second North American Record for *Puffinus assimilis*.—Among the birds in the collection which Mr. William Brewster bequeathed to the Museum of Comparative Zoölogy is a mounted specimen of a small black and white Shearwater bearing two labels. The original, in Mr. Arthur T. Wayne's handwriting, is as follows: "*Puffinus auduboni*, Summer, ♂, Sullivans Id., S. C. Disabled and exhausted but not dead. Taken after a storm on the Florida coast." Mr. Brewster's label is, of course, essentially the same, omitting the details of capture and carrying in addition his catalogue number 20051.

With a view to obtaining a little more of the history of this specimen, I wrote to Mr. A. T. Wayne asking him if he could not supply a few additional details; this he very kindly did, partly from his remarkable memory and partly from his records. From him I learned that the specimen was

picked up in August, 1883; it was mounted by the late Mr. John Dancer from whom Mr. Wayne acquired it in 1884 and in whose possession it remained until he sold it to Mr. Brewster in January, 1889.

The specimen was mentioned by Smyth, 'Proceedings Elliot Society of Arts & Sciences,' 2, August, 1888, p. 212, and recorded by Wayne, 'Birds of South Carolina,' p. 9, as *Puffinus l'herminieri*.

Some time ago Mr. Bangs called my attention to the fact that the specimen in question was not an Audubon's Shearwater, (*Puffinus l. l'herminieri*), but until recently no attempt has been made to identify the specimen correctly. Now in the course of a critical examination of the Tubinares in the Museum of Comparative Zoölogy collection it appears that the specimen is referable to one of the races of *Puffinus assimilis*. This specimen constitutes the second North American record for the species; the first occurrence, that of a bird that struck a lighthouse on Sable Island, Nova Scotia, having been recorded by Dr. Dwight in the 'Proceedings of the Biological Society of Washington,' 1897, II, pp. 69-70.

While the probabilities are strongly in favor of both these proving identifiable as the form from the Madeiras and Canary Ids. (*Puffinus baroli* Bp. Consp. Av. 2, 1857, p. 204), Dr. Murphy to whom I showed the South Carolina specimen, and who agrees in pronouncing it an *assimilis*, believes that the subspecies of *Puffinus assimilis* are so close that any attempt at subspecific determination based on a straggler must be unsatisfactory.—JAMES L. PETERS, *Museum of Comparative Zoölogy, Cambridge, Mass.*

The Black Duck in Colorado.—Through the kindness of Mr. Victor Kennicott of Denver I recently received a specimen of this duck (*Anas rubripes*). Mr. Kennicott secured it at the Kennicott Duck Club (east of Longmont, Colo.) on December 9, 1923; there were three individuals of this species amongst a flock of Mallards, one of which he secured. The Black Duck is exceedingly rare in Colorado, there being only two or three previous published records. The specimen was a male and weighed, two days after killed, two pounds and fourteen ounces.—W. H. BERGTOLD, *Denver, Colo.*

European Widgeon in North Carolina.—While a number of European Widgeons have been taken along the Atlantic coast the definite records of captures in North Carolina seem few enough to warrant the recording of an additional specimen. A fine male in perfect plumage was obtained on January 28, 1924, by Mr. Charles M. B. Cadwalader at Waterlilly, N. C., on Currituck Sound and thanks to his generosity is now in the collection of the Academy of Natural Sciences of Philadelphia.—WITMER STONE, *Academy of Natural Sciences of Philadelphia.*

Blue-winged Teal Breeding on Long Island, N. Y.—A pair of Blue-winged Teals (*Querquedula discors*) were collected from a pond in a grassy

swamp in Orient, Long Island, on May 12, 1920. The female on being dissected was found to contain eggs, one which was practically ready for deposit. The Duck evidently had a nest in that vicinity. The pond bordered on an extensive marshland of several hundred acres mostly encircled by woods, tangles and creeks. This offered seclusion and an ideal location for the Teal to select as a nesting site.

In twenty years' observations the writer has recorded this species but a couple of times before in spring and on those occasions on much earlier dates. This Teal has been reported as breeding on Long Island many years ago. The establishing of this recent breeding seems to confirm the former record and is of much local interest.—ROY LATHAM, *Orient, Long Island*.

Ring-necked Duck in Northern New Jersey.—On March 25, 1923, the writers were as usual on spring Sunday mornings on the marshes of Overpeck Creek, Bergen County, studying the waterfowl, which seem to increase in variety and abundance every year. On this particular morning nine species of Ducks were found, the commoner such as the American Merganser, Black Duck and Pintail in abundance. After practically all the Ducks had flown away, a pair of Ring-necked Ducks were found hiding in the grass on the opposite bank. Soon, however, they swam out into the creek in the full blaze of sunlight, and we watched them for half an hour as they floated on the quiet water. The drake was immediately recognizable by its dark back, and triangular shaped, puffy head, and the female was a dark bird, without any white ring around the bill. A few minutes before we had seen a flock of Lesser Scaups at about the same relative distance, and the white backs of the males, and the white faces of the females gleamed in the sun. This species, which is well known to Griscom in life, has not been recorded from northern New Jersey. It is interesting to note that the preceding fall and winter produced an unusual number of Ring-necks from various points along the Atlantic seaboard.—LUDLOW GRISCOM and J. M. JOHNSON, *American Museum of Natural History*.

White-fronted Goose in North Carolina.—A White-fronted Goose sex unknown, was killed on Currituck Sound on November 13, 1923.

A party of Raleigh men was shooting from Lloyd O'Neal's place, Sea Gull, Currituck County, N. C., and, on the day in question, Eugene L. Bartholomew and another member of the party were occupying a blind together.

A single Goose had been noticed associating with several bunches of Canada Geese, flying from bunch to bunch without seeming to affiliate closely with any. Finally, a small bunch of Canadas rose and headed for the decoys, with the lone Goose leading, but all except the leader swerved off before coming within gunshot. The single bird was promptly killed by Mr. Bartholomew, and it later excited much interest among all who saw

it, as none of the party and none of the guides or other local men were able to identify the specimen.

It was brought back here along with other Geese and Ducks, and was included in a lot sent out in the country as material for a game dinner for the hunting party and their friends. I did not hear anything about a strange fowl having been killed until it had been picked and prepared for cooking, but as soon as my friend Bartholomew had told me of the taking of some kind of fowl unknown to the Currituck guides, and I had asked if it were possible to secure its head, or a leg or wing, he promptly jumped into his car and drove out to the Club where the dinner was to be, to see what he could save. He brought back the head and one wing and a foot, so identification was easy.

This is the second record of the White-fronted Goose in North Carolina, the other being that of a specimen in the flesh sent the State Museum by Captain T. J. Poyner in 1897, which was also taken on Currituck Sound, in January of that year.—H. H. BRIMLEY, *Raleigh, N. C.*

Behavior of Swans.—My scanty literature on the Swans fails to mention similar performances and possibly the one I observed a few years ago may be exceptional. One Sunday morning a man came to my house for information regarding the peculiar actions of a Swan. It appeared that a pair of tame Mute Swans from a private estate up the West Canada Creek had been spending some time in a cutoff part of the same creek just above here and known from its shape as "The Oxbow." This man reported having seen both the Swans alive at 5 P.M. the previous evening but on returning the following morning, one of them was apparently dead and its mate was slowly covering the body with mud and grass. I visited the scene twice Sunday afternoon and saw the big bird still at its sad work. The dead Swan lay on a mud bar extending out into the stream, and its white body was more than half covered with mud, roots and grass. The living bird was very tame and I was able to approach to within twenty-five feet of it. I was under the impression that some thoughtless person had shot the Swan. I would ask if this performance is characteristic of these birds.—CHARLES A. GIANINI, *Poland, N. Y.*

Curlew Sandpiper on Long Island, N. Y.—I collected a young female Curlew Sandpiper (*Erolia ferruginea*) at Mecox Bay, near Watermill, on September 7, 1923. I was occupied in observing a pair of Stilt Sandpipers when I heard the note of this bird, and subconsciously ticketed it as a "krieker" with a squeaky voice. It lit on the shore some distance away, and I thought no more of it. Soon it jumped, and flew about the inlet, zig-zagging erratically, and I listlessly watched it, without much attention. The bird suddenly swerved nearer, and I "came to life" with a start, realizing that it was no common creature of this locality, whatever else it might be. Nearby, it resembled in some way a sort of aberrant Dowitcher, the suggestion being due to the tint of rusty underneath, the comparatively

long bill, and the hint of white on the lower back. Of course it was smaller. In its manner of flight and in the possession of a white rump it looked a little like a White-rumped Sandpiper.

It flew far down the coast, leaving me in a most unpleasant frame of mind, but eventually returned, and flew close over my head, and I killed it. Unluckily, almost the whole charge of shot smashed into it, and it was sadly mangled, but quite recognizable. The skin was preserved after much nerve-racking work, and identified as the Curlew Sandpiper by Mr. W. Miller, Mr. Griscom, and Mr. Chapin, of the American Museum of Natural History. Since the days of Giraud but two specimens of this species have been taken on Long Island, the last in 1891, I believe.—WM. TOD HELMUTH, 3RD, *New York City*.

Curlew Sandpiper on Fishers Island, N. Y.—On December 19, 1923, I was on Fishers Island, N. Y., with Messrs. L. C. Sanford, Justus von Lengerke and Harry Ferguson and shot what I supposed to be a very late lingering White-rumped Sandpiper. On getting it home and comparing it, I found it did not tally with my skins at all nor with descriptions, the long legs and long decurved bill especially attracting my attention.

On further investigation it proves to be a Curlew Sandpiper (*Erolia ferruginea*) in typical winter plumage. It seems such a rare occurrence in the east as to merit record in 'The Auk.'—LOUIS A. FUERTES, *Ithaca, N. Y.*

Peculiar Behavior of the Spotted Sandpiper (*Actitis macularia*).—The normal behavior of an animal is well defined within certain limits, i.e., an animal's activities are curtailed to a considerable extent as a result of the specialization of the structures involved. There are, however, instances where animals perform acts which involve a specialized structure and which seem to be contrary to its normal function. For example, the legs and feet of shore birds are adapted for wading but it is also possible for some of the group,—the Solitary Sandpiper, the Yellow-legs, etc.,—to perch.

On June 25, 1923, at Orient Bay, Lake Nipigon, Ontario, the writer observed a Spotted Sandpiper perching on a telegraph wire. The fact that the species was perching was not surprising but the size of the perch made the observation of interest. The bird was not in an erect position, being squatted, which probably made the feat less difficult. In this case the act was entirely voluntary and not an instance of unusual conduct due to the pressure of an emergency.

Activities for which an organism is not particularly adapted may be undertaken especially when the survival instincts are stressed.

On July 31, 1923, at the same locality as mentioned above, I forced a young, flightless Spotted Sandpiper to swim. After trying to dodge and run past me it was finally cornered on a gravel bar where it was forced to

swim or be caught. Rather reluctantly it took to the water, swimming well for twenty yards. Here it scrambled ashore and resorted to the more usual mode of protection by squatting motionless among the debris along the shore. Swimming, it seems, was an act prompted by self preservation and was accomplished although the species is not equipped with webbed or lobed feet.

It appears that as long as an act is physically possible it may be attempted. Instances of actions at wide variance to an animal's usual activities are of interest especially if the reason for the unusual act appears evident. It can only be conjectured whether such behavior is due to a re-occurrence of a primitive instinct or whether the individual has "experimental" tendencies. There is also a possibility that certain acts which appear unusual are merely infrequently observed.—L. L. SNYDER, *Royal Ontario Museum of Zoology, Toronto.*

A Death Trap to the American Barn Owl (*Tyto pratincola*).—Within 200 yards of my house is a piece of land known as "Porcher's Island Field" on which I have taken a great many albinistic Sharp-tailed Sparrows as well as a Sprague's Pipit (*Anthus spragueii*) on November 24, 1893, a Dickcissel (*Spiza americana*) on May 13, 1910, also all forms of eastern Sparrows that frequent the salt marshes, as well as Marsh Wrens. In October, 1919, I found in the field a dead American Barn Owl and wondered how it happened to be killed. The next year, in November, I found the remains of another Barn Owl on the top of a dead pine tree (snag) within 75 yards of the spot where I discovered the first one, and the following October (1921) I found the remains of another bird at high water mark that had been picked clean and done as if by the hand of man. Upon examining all the feathers carefully I identified a feather that belonged to a Great Horned Owl showing conclusively that all these Owls must have been killed by a Great Horned Owl. In December, 1923, Mr. Edward von S. Dingle (who now lives near me) found the remains of a Barn Owl in this field and in close proximity to the places where all the other Owls had been killed. Here is a case of an Owl preying upon another Owl of inferior size and less ferocity.—ARTHUR T. WAYNE, *Mount Pleasant, S. C.*

The Type Locality of *Alcedo cristata* Linné.—In a recent number of the 'Bulletin' of the British Ornithologists' Club,¹ Col. Meinertzhagen has described *Corythornis cristata johannae* from Anjouan Island, Comoro Islands. Unfortunately Anjouan Island (or Johanna, as it used to be called) happens to be the type locality of *Corythornis cristata cristata* (Linné),² as selected by Oskar Neumann³ several years ago, and therefore Col. Meinertzhagen's name must fall as a direct synonym of *Alcedo cristata* Linn.

¹ 44, 24 Jan. 1924, p. 44.

² (*Alcedo*) *cristata* Linné Syst. Nat. 1, ed. 12, 1766, p. 178.

³ Orn. Monatsb. 23, 1915, p. 157.

The *terra typica* of Linné's bird is given by him as "India Orientali," based in part on *Alcedo amboinensis cristata* of Seba¹ and *Ispida philippinensis cristata* of Brisson,² from Amboina and the Philippines, the latter name based in part on Seba, and in part on Klein, as well as on specimens in the de Réaumur collection.

The diagnosis given by Seba is inadequate, but his poorly drawn figure is readily identifiable as a *Corythornis*; though his description reads that the bill is yellow, the figure shows it as dark. Brisson's figure is not certainly recognizable; it could just as well represent some form of *Alcedo atthis*, but his minute and careful description can apply only to a *Corythornis*, and to one of the black-billed forms, since the color of the bill is distinctly said to be black, in spite of his references to Klein and Seba, both of whom described a bird with a yellow bill.

Thus far Linné's bird is really a composite species, but following the "habitat" he ascribed to the species he inserts the words "Rostrum nigrum, Pedes rubri. Confer. Edw. av. t. 336" thereby making his description applicable only to a *Corythornis* with black bill and red feet. Thus the name *Alcedo cristata* Linné must be applied to a black-billed form of *Corythornis*, either the Madagascar or Comoro Islands bird, since the African forms have a red bill (yellow in skins). Turning to Edwards' Gleanings, 3, 1764, pl. 336, we find a colored plate answering just such specifications, inscribed "The Crested Kingfisher from the island of Johanna," which is immediately recognizable as the bird known today as *Corythornis cristata*.

While Neumann (l.c.) indicated Joanna Island as the type locality he did not formally so designate it, though his action would seem to be sufficiently binding even though Linné's reference to Edwards were not entirely enough to restrict automatically *Alcedo cristata* Linné to Joanna Island. This genus is not found anywhere in the East Indies, both Seba and Brisson being in error as to the origin of the specimens they both described and figured.—JAMES L. PETERS, *Museum Comp. Zool., Cambridge, Mass.*

The Giant Kingfisher (*Ceryle torquata stictipennis*) in Grenada.

—On July 12, 1922, while searching for birds in a small mangrove swamp near the city of St. George's, Grenada, one of these large Kingfishers alighted on a tree about 20 feet in front of me, but on seeing me he instantly took wing again. I have not been able to find any previous record of the occurrence of this species in Grenada.—STUART T. DANFORTH, *Mayagüez, Porto Rico.*

Arctic Three-toed Woodpecker in New Jersey.—On November 29, 1923, Mr. S. V. LaDow and I were walking through the Phelps Estate near

¹ *Rerum Naturalium Thesauri* 1, 1734, pl. 63, fig. 4.

² *Ornithologie*, 1760, Tome IV, p. 483, pl. XXXVII, fig. 3.

Englewood, Bergen County. All fall in this section the Hairy and Downy Woodpeckers have been unusually common, and there was obviously a southward migration of these ordinarily sedentary species. While among the numerous ornamental conifers in the Estate, a particularly loud tapping was investigated by LaDow, who forthwith called my attention to a peculiar-looking Woodpecker, which I immediately recognized as an Arctic Three-toed, the first record for the State. The bird, which was a male, was busily feeding in the top of a dead conifer, and was observed at leisure. As I was already committed in print to the belief that accidental visitants should not be added to a State avifauna on sight records alone, every effort had to be made to collect the specimen. I had no gun and collecting permit for New Jersey, but fortunately remembered that my good friend Mr. J. A. Weber, a fellow Linnaean member, living nearby at Leonia, had both. Leaving Mr. LaDow on guard, I rushed to the nearest phone, called Mr. Weber up on long distance and entreated him to drive over and "take a chance" on our keeping the Woodpecker in sight. He most kindly consented to come immediately, and I then rushed back to find that all was well, the Woodpecker was apparently rooted to his tree, and LaDow was reclining at the base of a nearby tree with his neck cocked at the proper angle. I then repaired to the main road to flag Mr. Weber, anxiously pondering the question "Would the Woodpecker fly, or not?", occasionally glancing in LaDow's direction. Twenty-five minutes later I was horrified to see LaDow disappearing over the brow of a hill, his coat-tails flying behind him. Five minutes later Weber arrived and we both rushed over the hill in pursuit. The faithful and efficient LaDow still had the Woodpecker in sight, and while it was restless and on the move, Mr. Weber was able to catch up and collect it. I am greatly obliged to both gentlemen for their kind cooperation, and Mr. Weber has generously presented the specimen to the American Museum of Natural History, so that the record is positively authenticated for all time. A word of recognition should also be given, however, to our extraordinary good fortune. My attempts to show a rare bird to others have almost always been failures.—LUDLOW GRISCOM, *American Museum of Natural History*.

The Acadian Flycatcher (*Empidonax virescens*) at Cold Spring Harbor, Long Island.—During the summer of 1922, from the middle of June until the end of July, a pair of Acadian Flycatchers was resident at Cold Spring Harbor, L. I., a few hundred yards west of the Carnegie Institution Experiment Station. The male was readily identified by the characteristic song, and although all effort was made to locate the nest, the search was unavailing, and no young birds were found.

On June 17, 1923, a singing male was observed, but no mate appeared, this constituting the only positive record for the summer. However, on August 18 an adult *Empidonax* was found feeding a fully fledged bird of the year, about a mile from the above mentioned locality. These two

birds were moving rather rapidly about an old apple orchard and although they were kept under observation for almost an hour, no characteristic notes were heard. Considering the fact that, to my knowledge, no Alder or Least Flycatchers were breeding in the region, it seems probable that these were Acadians. Perhaps the nest of the bird recorded on June 17 met with some mishap and the birds moved over to the orchard and made a second attempt. The condition of the young bird at such an abnormally late date supports this contention.

The Acadian Flycatcher was formerly found breeding in this region, but no recent records have been published. (L. Griscom: Birds of the New York City Region.) Unfortunately the nest was not found, but the evidence points, I believe, to the species occurring as a very local and perhaps irregular summer resident.—RUDYERD BOULTON, *University of Pittsburgh, Pittsburgh, Pa.*

Owls and Starlings.—Members of the A. O. U. who attended the Cambridge meeting last October may recall the short account given of the Sparrow and Starling Roost in Scranton. This roost no longer continues. The birds began to occupy the trees about the court house last autumn as usual. In early November a friend told me of seeing quite a commotion among the birds one evening and investigating the matter he found there was a small Owl after the birds. In the darkness he could not be certain whether it was a Screech Owl or a Saw-whet Owl. Being in the central part of the city a few evenings later I was surprised to see no birds on the trees where there had formerly been thousands at that time of night. My first thought was that they had simply moved to another part of the square but when I walked around the block not a bird was to be seen anywhere in the trees. The characteristic notes of the Starlings could be heard from the roofs and towers of the higher buildings but the trees were absolutely deserted. There is not the least doubt in my mind that the Owls caused the birds to seek other quarters. Comparatively few of the Starlings now roost on the neighboring buildings and so it is probable that the birds have found other roosting places.—R. N. DAVIS, *Scranton, Pa.*

Evening Grosbeak at Rochester, N. Y.—On November 11, 1923, two pairs of Evening Grosbeaks were seen in front of our house. They arrived about 12 o'clock, and remained for three hours feeding on the seeds of a Box Elder, when they flew off, apparently for good as they have not been reported any where around here since. They were quite unafraid, as is customary with them, allowing one to come within two feet. It was also interesting to note that they were not frightened at the automobiles which whizzed by continuously within eight feet of them.—HAROLD G. DYE, *Rochester, N. Y.*

An Abnormal Purple Finch (*Carpodacus purpureus purpureus*).—I shot on March 6, 1923, an adult male Purple Finch that has the under tail coverts conspicuously streaked like Cassin's Purple Finch (*Carpodacus cassinii*). The streaks are very broad and long and identical with the streaking in *C. cassinii*, but the rest of the plumage is typical of *C. p. purpureus*.

Purple Finches were abundant from February to late in March, 1923, which is the first time I have seen them in numbers since 1907.—ARTHUR T. WAYNE, Mount Pleasant, S. C.

Seaside Sparrow in Central Park, New York City.—Early on the morning of May 16, 1923, I was crossing the bridge over the Lake leading to the Ramble on my daily tour of inspection, and was astounded to see a perfectly good Seaside Sparrow running down the rain gutter about ten feet ahead of me, in its characteristic crouching and secretive manner. Apparently it imagined that the salt marsh grass was there, as it stopped and permitted a leisurely observation in full view. A few minutes later I spied Dr. Ellsworth Eliot in the distance, who correctly interpreted my violent signals, and came running up, also to gaze upon the sparrow now crouched under a scraggly bush on the bank. A half hour later I returned with Mr. and Miss Capen, members of the Linnæan Society. The Sparrow was under the same bush, and was apparently bewildered and dumb-founded. The salt marsh grass was lacking, and it did not seem to know what to do, so it did nothing. We were able to walk up to within 15 feet, and if it ran three feet to another bush, it would run back again in a few minutes. This was sufficient to start the Park "bird-telegraph" going, and when I dropped in again at noon several people kindly informed me that there was a Seaside Sparrow in the Ramble! No bird is more strictly confined to its chosen habitat than this Sparrow, which is really accidental anywhere except in the salt marshes where it breeds. There was a colony in a marsh containing salt springs at Piermont, N. Y., on the west bank of the Hudson, just north of the New Jersey State line, but it has not been visited for many years, and I do not know whether it still exists. There is no record in the New York City Region of the Seaside Sparrow anywhere away from its breeding grounds. The preceding night was cooler than normal, with dense fog the first half.—LUDLOW GRISCOM, *American Museum of Natural History*.

Albinism in the Sharp-tailed Sparrow (*Passerherbulus caudatus*).—In 'The Auk' for October, 1921, pp. 604-605 and again in Vol. XXXIX, 1922, p. 265, I have recorded numerous specimens of this bird taken or seen within a short distance of my house ever since 1900 and in each consecutive year.

On November 16, 1923, I visited the place for the first time that year and saw three albinistic birds, one of which I shot. I visited the place again on November 26 and saw the two remaining birds, one of which I collected,

leaving the other undisturbed. The bird collected on November 16, while lacking the spotting on the abdomen and ventral region, has a much lengthened appendage on one secondary feather while the other is profusely spotted on the abdomen.

My belief is that the albinistic birds are descended from an albinistic parent for in all these years that I have been observing these abnormal birds I have always left undisturbed one or more that plainly showed albinism and each season from one to four birds would appear with the greatest regularity at the same place showing that this strain is descended from the birds left undisturbed by me from year to year. This makes 24 uninterrupted years that I have observed these birds.—ARTHUR T. WAYNE, Mount Pleasant, S. C.

Bohemian Waxwing at Jackson, Mich.—On March 11, 1923, in company with Randal McCain I saw two flocks of Bohemian Waxwings, one of thirty, the other of sixty individuals. These birds stayed in the vicinity of Jackson until early in May in broken companies, sometimes feeding on the American holly placed in winter porch boxes, sometimes on the berries of vines and shrubs throughout the city.—EDITH K. FREY, Jackson, Mich.

White-eyed Vireo at Madison, Wis.—A White-eyed Vireo (*Vireo griseus griseus*) associated with Golden-crowned Kinglets, was observed in a densely leaved seedling apple tree on October 21, 1923. On shooting, the bird appeared to have vanished completely. While attempting to be philosophical, a fluttering object was by chance observed to strike the ground at a considerable distance on my right. The potential leaf proved to be an immature male Vireo of the above species.

While it is useless to speculate on the presence of this always rare Wisconsin species at so late a season, its presence probably represents a case, recognized in recent years as not uncommon, of immature birds wandering north of the breeding grounds in autumn.—A. W. SCHORGER, Madison, Wis.

Philadelphia Vireo in the New York City Region.—In my recently published 'Handbook' to the birds of this region I discoursed at some length on the extreme local rarity of this Vireo. Two days after the appearance of this book or to be exact, on September 16, 1923, I discovered one on the "Point" of the Ramble in Central Park, New York City, in some low bushes where I had found one two years previously. It was very leisurely in its movements, and was only 25 feet away at about the level of my eyes when I spied it. It objected strongly to my presence, and scolded me harshly, gradually working nearer as it did so. A big wave of migrants had arrived overnight, and the scolding attracted a crowd of Warblers. At one time an adult male Tennessee Warbler was less than two feet from the Vireo, affording a faultless opportunity for comparison.

What was undoubtedly the same individual was found in the same place the next day at noon. Later that same afternoon Mr. Charles Johnston of the Linnæan Society found a Philadelphia Vireo in the same place, and reported an ideal study of it. His visit to the Park and his discovery were entirely independent of my own, of which he was entirely ignorant, and consequently I regard his observation as an excellent corroboration of mine. Dr. Robert Cushman Murphy observed another individual most excellently on October 3 near Bronxville, Westchester Co., N. Y., and Mr. George E. Hix found another on September 23, in Van Cortlandt Park which was studied at leisure, and reported at a subsequent meeting of the Linnæan Society. Thus the Philadelphia Vireo was observed four times last fall, whereas there are only eight other records for the immediate vicinity of the City in all previous years. I am much obliged to the gentlemen mentioned for permission to use their observations.—LUDLOW GRISCOM, *American Museum of Natural History*.

The Cerulean Warbler (*Dendroica cerulea*) in Central Park, New York City.—In view of the appearance of the Cerulean Warbler in the lower Hudson Valley in recent years, the following record for this species in Central Park may be of interest.

On September 15, 1923, a single female Cerulean was seen in what is commonly known as the "Ramble." The bird, in company with several Palm and Black-throated Green Warblers was observed for three or four minutes with 8× binoculars at a distance of about thirty feet. It was leisurely feeding among the smaller branches of an elm at a height of about twenty feet from the ground and did not seem to be in the least alarmed at the presence of the observer.

Apparently there was a large southward movement of Warblers the night before, a total of eight species being recorded in less than an hour, and this bird may well have been one of the Dutchess County breeders.—RUDYERD BOULTON, *University of Pittsburgh, Pittsburgh, Pa.*

Black-throated Gray Warbler in Massachusetts.—On the morning of December 8, 1923, I noticed a small bird, which I at first thought to be a Myrtle Warbler, fly out from a half-dead clematis vine which grows on our house here in Lenox. This struck me as being rather unusual, so I followed it up, and had another very brief sight of it,—just enough to show me that it was *not* a Myrtle Warbler, but not enough to prove to my satisfaction what it was.

The next morning my boy brought in this same bird which he had found dead under the same clematis vine. Suspecting its identity, but wishing confirmation, I sent the skin to the American Museum of Natural History where it was examined by Messrs. Miller and Griscom who pronounced it, as I had suspected, a Black-throated Gray Warbler (*Dendroica nigrescens*), probably a bird of the year. How this bird came to be in Berkshire County, Massachusetts, about 2500 miles out of its range; and what it was doing

here so late, even in a very mild season, is a matter for speculation. The body was lean, but hardly emaciated. With such a very dull plumaged little creature, the escaped cage-bird theory is out of the question.

At the request of the American Museum of Natural History, I am giving this specimen to the Boston Society of Natural History, as it is undoubtedly an addition to the avi-fauna of New England.—CLARK G. VORHEES, *Sunnyridge, Lenox, Mass.*

Short-billed Marsh Wren at New Brunswick, N. J.—On September 12, 1923, I heard a Marsh Wren scold issuing from a small clump of tall grasses at the very edge of the Raritan River. I immediately recognized the notes as different from those of the familiar Long-billed species. On investigating more carefully I was able to obtain fine views of three Short-billed Marsh Wrens (*Cistothorus stellaris*). On September 15 there were four in the region, three in clumps of tall grass at the river edge, and one in a grassy part of the marshes farther inland. One was seen again on September 18, and one on September 22. I had not been in New Brunswick during the summer, so have not been able to ascertain whether they bred there or not.—STUART T. DANFORTH, *Mayagüez, P. R.*

Blue-gray Gnatcatcher in the District of Columbia in Winter.—On the afternoon of January 1, 1924, I observed a Blue-gray Gnatcatcher (*Polioptila caerulea caerulea*) in Washington, D. C. The bird, which was a female or juvenile, having no black on the crown, was hopping about in search of food on the limbs of Japanese cherry trees on the southwestern side of the Tidal Basin. The only other winter record for the District of Columbia and vicinity is that of a bird observed by Miss May T. Cooke, of the Biological Survey, at Arlington Farm, near Rosslyn, Virginia, on January 1, 1917 (M. T. Cooke, Proc. Biol. Soc. Washington, XXXIV, 21, 1921).—S. F. BLAKE, *Bureau of Plant Industry, Washington, D. C.*

Ruby-crowned Kinglet Summering at Rochester, N. Y.—A pair of Ruby-crowned Kinglets were seen about Rochester all of the summer of 1923. They were first observed July 2 and frequently thereafter. I failed to find a nest and probably they were left over at the time of the spring migration.—HAROLD G. DYE, *Rochester, N. Y.*

Bicknell's Thrush in Northern New Jersey.—When compiling data for my recently published 'Handbook to the Birds of the New York City Region,' I was unable to find a single authentic record of Bicknell's Thrush for the northern part of the State. A short time ago Mr. C. B. Isham walked into the Bird Department, and presented the Museum with a male collected by him October 10, 1915, at Orange. While I doubt if this subspecies is particularly rare, it seems advisable to put this capture on record.—LUDLOW GRISCOM, *American Museum of Natural History.*

Robins Nesting at Houston, Texas, 1922 and 1923.—The alarm call of a Robin, heard on June 11, 1922, when I supposed they had all gone north, was a great surprise to me and when I saw him fly from the oak near our front door, I wondered how he happened to have remained so far south.

On July 9 I saw a Robin with a bill full of food and knew that there must be a nest of young in the neighborhood.

Mr. James D. Dawson, an old resident of Houston and one of my neighbors, informed me that he had seen two pairs of Robins almost daily on his lawn and had heard them singing every morning. He showed me a nest on a sweet gum tree in his yard and one of the old birds was sitting on a branch close to it. He also stated that he had never before known of Robins being in Houston in the summer nor heard of their nesting.

On October 4 I saw a pair, but they might have been early migrants. In February, 1923, I secured the nest which with its mud foundation was characteristic.

On March 23, I saw a pair and on April 4, Mr. Dawson told me that the Robins were seen by him and heard singing every day. I saw one on April 5 and was told by the gardener of the house across the street from Mr. Dawson's, that he had noticed two pair evidently at home. From that time on, scarce a day passed without my seeing either one or two and on May 30 I saw and heard one singing for the first time.

June 2, 1923. Fully fledged young bird seen, spotted breast, well able to fly.

- " 3, Partly fledged young bird seen, short tail and hardly able to fly, and two pair of adults were also seen.
- " 4, 5, 6, 9, Fully fledged young bird and adult seen.
- " 11, Three fully fledged young and an adult seen in our yard, and calling up Mr. H. P. Attwater he came and saw one young bird and the adult.
- " 15, Adult seen.
- " 27, Adult seen and I heard one and I think two singing.
- " 28, Found a nest with bird sitting and saw the mate nearby.
- " 29, Saw adult feeding the young in the nest and heard another singing.
- July 3, Two fully fledged young seen and an adult singing.
- " 5, Two partly fledged young seen just able to fly and an adult singing.
- " 6, One young bird seen and an adult heard singing.
- " 7, Heard one singing.
- " 11, 19, Five seen in our yard.
- " 21, Three seen in our yard and one heard singing.
- " 22, Two seen.
- " 23, One seen and another heard singing.
- " 26, Heard two singing and a third uttering the alarm note, while I watched him.

- Aug. 1, Two seen in our yard.
" 15, One seen in our yard.
" 17, One seen sitting on the nest and afterwards standing on the edge.
" 18, One seen standing on the edge of the nest, but no sign of young birds; nest too high to examine.
Sept. 1, One seen.
" 5, Four seen in our yard and I got a picture of one.
" 6, Saw one and that was the last noticed.

On October 10 I was informed that a pair had nested in a sweet gum tree across the street from the nest found on June 28 and had raised two broods—the old birds being watched as they fed the young in each case. I could not however find the nest.

One pair certainly bred in 1922 and three or four broods were evidently raised by at least two pairs of old birds in 1923 and this I think is the first record of Robins remaining and breeding at Houston, Texas.—ROBERT B. LAWRENCE, *Houston, Texas.*

Notes from Rochester, N. Y.—*Picoides arcticus*.—ARCTIC THREE-TOED WOODPECKER. On October 20, 1923, a male was observed in a soft maple and ash woods near Lincoln Park just outside the city limits of Rochester. There could be no mistake in the identification, as the bird was not shy and was observed with 8 power glasses. I have photographed this species and the American Three-toed Woodpecker in Canada and am also familiar with the Alpine Three-toed Woodpecker of northern Arizona. As far as I know, this is the first record for Monroe County although four days later on October 24 a dead bird of this species was found at Sea Breeze on Lake Ontario near Rochester by Miss A. Wells and is now preserved in the Municipal Museum here.

Dendroica caerulescens.—BLACK-THROATED BLUE WARBLER. On July 2, 1923, a male Black-throated Blue Warbler was heard singing on Big Black Creek, a tributary of the Genesee River about five miles southwest of Rochester. Although heard on several later occasions, I was unable to find the nest. This is my first record of the breeding of this species near Rochester.

Dumetella carolinensis.—CATBIRD. On December 23, 1922 and again on January 1, 1923, a Catbird was observed at Bushnells Basin about seven miles southeast of Rochester. When observed the bird seemed numbed with the cold and allowed me to approach within ten feet. It was not seen again and probably perished from the extreme cold weather of late January or early February. This is my first winter record for Rochester and vicinity.—OSCAR F. SCHAEFER, *Rochester, N. Y.*

Notes from Eastern Long Island.—*Tryngites subruficollis*. BUFF-BREASTED SANDPIPER. A single bird of this beautiful species was collected at Mecox Bay on August 22, 1923. In flight it suggested a Dove, and was

easily recognized in life, after a few moments' observation through field-glasses. I have twice before taken this species on Long Island, and have twice seen it without harming it. The dates are: September 7, 1911, Easthampton; September 4, 1916, Bridgehampton; September 8, 1916, Montauk; August 28, 1920, Montauk, and the present record, as given above.

Numenius americanus. LONG-BILLED CURLEW. This species is now so rare on Long Island that it seems no waste of time or space to mention the occurrence of one of them at Mecox Bay, on August 24, 1923. I did not collect the bird, but as I am quite familiar with the Hudsonian Curlew (and its variations of bill-length, etc.), and have seen *americanus* once before on Long Island and twice in South Carolina, I think this "sight-record" may receive credence. The bird flew over my blind and set its wings to my decoys, but wisely refused to be fooled, and soared down to the beach about 200 yards away. I watched it for a few moments, until it began to peck lazily at the sand, and began to stalk it elaborately, but with poor success. The bird was very wild, I am glad to say, and permitted no familiarity. Its great size, disproportionately long bill, and the smooth uniformity of color under its wings (well-observed as the bird sailed over the blind), left me in no doubt as to what I had seen. I have one other record, August 26, 1910, and think I have seen another at Montauk, but could never be sure of this.

Mimus p. polyglottos. MOCKINGBIRD. I have two records for this species on Long Island in 1923, namely, September 6, at Montauk; and about September 20, 1923, at Easthampton. I regret that the exact date when the second bird was seen has been lost, having been noted in a "loose-leaf" book, the leaves of which proved to be all too loose! I believe that a few Mockingbirds occur every year, in August and September, in the vicinity of Montauk Point, for I have several other records, and know of still others, reported to me on excellent authority.—WM. TOD HELMUTH, 3RD, New York City.

Some Bird Notes from Jaffrey, N. H.—*Zenaidura macroura carolinensis*. MOURNING DOVE. On April 30, 1916, two of these birds, the first and only I have seen in Jaffrey, appeared near the village of East Jaffrey. On May 1, I heard a great commotion in front of the house I was living in, and on stepping out I saw a Short-eared Owl fly into the front yard with a Mourning Dove in its clutches. It flew against the side of the house and dropped the Dove, but was able to fly away again. On picking up the Dove it was found to be dazed, but not badly injured. For awhile I held it in my hands, but later it showed signs of wanting to escape, so I took it to a neighboring orchard and let it go. It was able to fly, though somewhat erratically. This occurred about the middle of the afternoon. Since then I have seen no Doves in Jaffrey.

Hesperiphona vespertina vespertina. EVENING GROSBEEK.—From August 25 to September 10, 1923, I frequently saw a flock of four Evening Gros-

beaks near the village, and Miss Lucia Cutter tells me that she saw them as early as the middle of August. On August 25, one of them was singing in a large elm tree. The song reminded me of a weak Purple Finch song, but less varied. The occurrence of this species in summer seems rather unusual.

Vireosylva philadelphia. PHILADELPHIA VIREO.—On August 25, 1923, I observed one flitting about catching insects in a birch tree at the edge of a swamp. It was observed at a distance of about fifty feet with 8 X binoculars. The all yellow underparts and whitish line over the eye were distinctly noted, also the absence of distinct wing-bars. Miss Nina G. Spaulding also observed this bird.

Cistothorus stellaris. SHORT-BILLED MARSH WREN.—Since about 1914, possibly earlier, one pair of this species has bred every year in the Cutter Meadow. This is a low, damp meadow with a small brook running through it. It is overgrown with meadowsweet, chokeberry, grasses and sedges with occasional small "islands" of blueberry, alder, *Viburnum dentatum*, meadowsweet and maleberry. I have never succeeded in locating the nest, perhaps partly due to the fact that I have never been so situated that I could observe the birds through the entire breeding season. In August the parent birds appear with young ones, and about that time the male stops singing, but they stay until the middle of September. During the latter part of August they can often be found scolding in the small "islands" just described. There are so few New Hampshire records for this species that I wish to place this on record.—STUART T. DANFORTH, Mayagüez, Porto Rico.

RECENT LITERATURE.

Dawson's 'The Birds of California.'—This long looked for work¹ has at last appeared. It has a history reaching back almost to the time of publication of 'The Birds of Washington' by the same author in collaboration with Mr. J. H. Bowles, for in his review of that notable work Dr.

¹ The Birds of California | A Complete, Scientific and | Popular Account of the 580 Species and Subspecies of Birds | Found in the State | By William Leon Dawson | of Santa Barbara | Director of the International Museum of Comparative Oölogy, Author of "The Birds of Ohio" | and (with Mr. Bowles) of The "Birds of Washington" | Illustrated by 30 Photogravures, 120 Full-page Duotone Plates and More Than | 1100 Half-tone Cuts of Birds in Life, Nests, Eggs, and | Favorite Haunts, from Photographs | Chiefly by | Donald R. Dickey, Wright M. Pierce, William L. Finley | and the Author | Together with 44 Drawings in the Text and a Series of | 110 Full-page Color Plates | Chiefly by | Major Allan Brooks | Format De Luxe | Large Paper Edition | Complete in Four Volumes | Volume One [—Four] | South Moulton Company | San Diego, Los Angeles, San Francisco | 1923 [= 1924] | Sold Only by Subscription. All Rights Reserved. | Quarto (9 1/2 x 12 1/4 ins.) Vol. 1, pp. i-vii + 1-522. Vol. 2, pp. i-xii + 523-1034. Vol. 3, pp. i-xiv. + 1035-1548. Vol. 4, pp. i-xiv + 1549-2121. An unpagged subtitle page is

Joseph Grinnell (*The Condor*, September 1909) expressed "a feeling of resentment towards the fate that led Mr. Dawson to select Washington for his field of ornithological labors, rather than California!" and in due course, as if in answer to his wish, Mr. Dawson appeared at a meeting of the Cooper Ornithological Club, in November 1910, and outlined his plans for another and still greater work on the birds of California. The Cooper Club gave this proposition its hearty approval and voted its cooperation to Mr. Dawson and in 1914 appeared a prospectus of the work which was expected to appear by May 15, 1916. Delay after delay was followed by war conditions and in August 1920 Mr. Dawson offered, in view of criticism at the delay, to relieve the Cooper Club of any responsibility whatever in connection with the publication which offer was accepted and since then he has been solely responsible for the preparation as he has always been for the financial side of the undertaking, although many of the Club members gave him continued aid for which due acknowledgment is made. In February and March, 1921 two "parts" of the work each of 64 pages, comprising the first 128 pages of Volume I of the completed work, appeared, but it was then decided not to issue further parts but to get the work out in its entirety and on January 24, 1924, we learned of its completion although the volumes all bear date of 1923.

Naturally in the case of a work so long delayed there has been much speculation as to what it would be like, and we feel that, as completed, it must fully realize the fondest hopes of both the author and subscribers. It constitutes Mr. Dawson's third state bird book having been preceded by 'The Birds of Washington' (above mentioned) in 1909 and 'The Birds of Ohio' in 1903. Each of these at the time of publication was described by reviewers as the most pretentious work on the birds of a single state that had yet appeared and we feel assured that 'The Birds of California' not only merits the same distinction but will hold it for many years to come.

In style it follows its predecessors being produced on almost exactly the same lines as 'The Birds of Washington' but since the original prospectus it has grown from three volumes to four while the number of illustrations has been vastly increased.

Ornithological publications, from the nature of the subject, offer many opportunities for elaboration and besides the author of the text there enters into the work the artist, the photographer, the engraver, the printer and the book maker all of whom may figure largely in the appearance and quality of the finished production. It seems fitting therefore that we should

inserted in Vols. 2-4 just before the main text with the numbers of the species treated—Species 103-201 in Vol. 2; 202-307 in Vol 3; 308-424 in Vol 4. None of the full page plates are numbered.

Price: De Luxe Format; Large Paper edition, \$185.; Sunset Full Fabrikoid edition \$225; Full Levant edition, \$260.; Patrons' Full Carved Inlaid edition, \$375.

Booklovers' edition, Smaller Format, four volumes, ninety-six plates, \$90; Students' edition lighter paper, three volumes, fifteen plates; Buckram, \$37.50. Half Leather, \$49.50; Full Leather, \$60.

consider such a work as this from three standpoints: that of the book; the illustrations and the text.

At our first sight of the work we are overwhelmed at the magnitude of the undertaking but the four stout volumes are none too many in which to treat of the 580 species and subspecies of birds found in California; the quarto size too is necessary to properly display the illustrations while the great weight is due to the requirement of heavily coated paper to carry off effectively the numerous half-tone text figures. It is interesting to note that in California we have presented the two extremes of thought in the matter of paper and half-tones. In this work the aim is to produce the most brilliant impressions and no consideration is given to the possible deterioration of coated paper, while in our esteemed contemporary 'The Condor' permanency of paper is regarded as all important and dullness of half-tones as a necessary accompaniment. Our successors several generations in the future will know which view was correct though whether any publications of 1924 will interest them is doubtful.

As soon as we begin to handle 'The Birds of California' we realize that author and publisher have manifestly not had in mind a hand-book for everyday use but a monumental work of reference, to be consulted on the library table and not in the easy chair by the fire-side. But the publishers have done their work remarkably well; the typography is attractive, the printing well done, the half-tones remarkably soft and the color plates and photogravures beautifully executed. We have seen only the binding of the large paper edition de luxe but it is attractive and substantial, uncut as such a work should be, gilt top and extra heavy boards covered with paper in two shades of green, while the inner lining consists of enlargements of photographs of flocking birds—Blackbirds, Cedarbirds, Gulls, and Pelicans and Ducks respectively in the four volumes. All of this work moreover with the exception of the photogravures and a few of the color plates and half-tones has been done in Los Angeles. A special bindery was, we are informed, established there for this work, though some of the editions have had to be farmed out elsewhere which will account for the further delay in delivery in certain cases. The work stands we believe as the most sumptuous publication ever produced on "the coast" and with the few exceptions above mentioned entirely the work of "home talent."

The illustrations are the outstanding feature of the work and in no other publication of the kind, we think, have they been so lavishly used. The author is himself a photographer of experience and ability and possesses a keen artistic sense, while he has had the hearty cooperation of Donald R. Dickey, who has carried artistic bird photography close to the point of perfection, and of William L. Finley and Wright M. Pierce who also stand among the leaders of the bird photographers. Most of the photographs are reproduced as half-tone text figures but there are also 120 full page duotones in which a tint of green or brown is added to the black of the half-tone with pleasing effect, and 30 photogravures printed in olive, brown or black on yellow-buff paper with beautiful

results. Finally there are the 110 color plates, from paintings, mainly by Allan Brooks but with one of the White-fronted Goose by Louis A. Fuertes and one of Lawrence's Goldfinch by George M. Sutton. Likewise a color plate of eggs and 44 half-tone text figures of birds from drawings by Brooks. Not all of the illustrations are original with this work as 130 of the text figures and some of the color plates appeared previously in the 'Birds of Washington.'

It would be hard to overpraise this array of bird pictures. Major Brooks is at his best in this series and many of his beautiful paintings represent species not hitherto adequately figured. Most of the photogravures and full page half-tones or duotones are really works of art as well as marvels of camera skill, notably the flight of Brewer's Blackbirds, the Dove on its nest, nest of Roadrunner and Leconte's Thrasher, the group of Mountain Chickadees, and the California Jay stealing an egg.

On almost every page of the book we face some bird portrait, some nest or some bit of beautiful scenery—Yosemite, Farallones or Salton Sea—until we are bewildered at the display. Criticism of such work can only be of minor details and purely on the ground of personal opinion. So we may say that to our eye the text figures would be improved if the often fantastic borders had been omitted and the photographs presented without any border at all. So too the rather flippant titles to some of the pictures do not seem in keeping with the dignity and beauty of the artists' work and smack somewhat of the captions on moving picture films.

In commenting on the text of a book one should consider what the author is endeavoring to do and to what class he is addressing himself. In the present case, if we interpret Mr. Dawson correctly, his effort is to present accounts of the birds which will interest the general reader and at the same time present the most salient points in the life history of each species. It seems to us therefore, at the outset, that the statement on the title page, that this is "a complete, scientific and popular account," is unfortunate, as the work is far from that, nor should a work on the plan of Mr. Dawson's attempt to be a "complete scientific" treatise. It would be sadly dry and uninteresting to the general reader if it were.

Looking upon the text from the standpoint taken above it seems to us in the main eminently satisfactory though the author's accounts hardly reach the high place in the field of literature that the illustrations do in the field of art. Those who can draw adequate pen pictures of birds are perhaps quite as rare as those who can depict them with the brush and far rarer than those who are successful manipulators of the camera. Moreover it is not to be expected that one writer can repeat over and over to the extent of adequately portraying the life and character of 480 species of birds. One writes best of the birds with which he is thoroughly familiar, and none are equally familiar with all the birds of a State or even of a small town. The ideal book of bird biographies must needs be the joint product of many pens and even so it oft times happens that he who knows a certain

bird best is least able to present that knowledge in a manner to constitute literature.

In Mr. Dawson's long series of bird biographies he has given us many delightful descriptions of the familiar California species and as particularly happy examples we should select those of the White-crowned Sparrows, the Linnet, the California Jay and several of the shorebirds, but in the short time at our disposal we have been unable to read carefully all of the pages of the four great volumes. As we turn these pages, however, bits of descriptive matter here and there catch the eye and stand out as literary efforts of high grade as the sketch of the Sanderling in its picturesque battle with the surf: "Forward and back, forward and back, they patter in ceaseless rhythm. Indeed they seem themselves a part of the tidal mechanism for they are swept along at the brink of the wave with foam white breasts and then disappear like bursting bubbles blending their colors with the sands which rustle with the waves retreat."

With the ability that the author displays in such passages as this it is rather depressing to find him in other instances lapsing into slang and dialectic expressions in an apparent attempt to be funny, and just as in our comment on the flippant titles to some of the pictures, we feel that this is out of place in a work as dignified as this, which does not need cheap pleasantries to make it attractive to the reader.

The several chapters "for younger readers," too, seem hardly worth while in a work of this kind. But perhaps this is all a matter of taste and certainly the great majority of Mr. Dawson's biographies are admirably suited to their purpose.

The scientific portion of the text is in the main contained in the introductory paragraphs to each species, and is arranged under the following headings: Synonyms (English); Description; Recognition Marks; Nesting; Range; Distribution in California and Authorities. The information thus presented is quite satisfactory and gives the reader in concise form the more important facts that he will desire.

Nomenclature and classification really should have no place in a work such as 'The Birds of California,' the best way being to follow some recognized authority, but our author has his own views on this matter and while adopting substantially the A. O. U. nomenclature has made some alterations based on his own preference, while his sequence of species seems also to be to some extent original. Beginning with the Crows and ending with the Grebes it is the reverse of the usual sequence but in the association of many groups is far more up to date than the A. O. U. 'Check-List'. As explained in the introduction the author uses a variety of vernacular names for the same bird which is bound to be misleading. It is interesting to note however, that the possessive "s" is used in the headings viz: "Gambel's Sparrow," while in the running titles at the top of the page it appears "Gambel Sparrow," as though to satisfy both sides in this controversy. The use of a running title such as Solitary Vireo which refers to an eastern

form, while such well known western birds as the Plumbeous and Cassin's Vireos are those discussed, is further confusing to the lay reader.

Keys to the orders, families and species, a hypothetical list and an index bring the work to a close.

It is obvious that the reviewer though he may have indulged in a few expressions of personal preference has but little criticism to make of 'The Birds of California.' It is not only like its predecessors the most pretentious work on the birds of a single state that has yet appeared, but one of the most notable of our bird books, and a lasting credit to all who have had a hand in its making.—W. S.

Dr. Phillips' 'Natural History of the Ducks.'—The second volume of Dr. Phillips' notable monograph of the Ducks¹ will make a still stronger appeal to those interested in this group of birds—both sportsmen and ornithologists—than did the first, partly because of the greater number of colored plates but mainly, we think, because it deals with so many more of the familiar American species in which we are mainly interested.

There are twenty-six full page plates, all but six in colors, twenty being from paintings by Allan Brooks, four by Louis A. Fuertes, one by H. Grönvold and a frontispiece of Mallards by F. W. Benson. Some of the plates represent more than one species although they are never crowded so as to affect the artistic beauty of the picture, while three of Brooks' plates consist of two drawings each of Ducks in the act of display during the mating season. There are also 38 outline maps showing the distribution of the species. The plates are very satisfactory, the figures being large, from two to five on a plate so that they show the details of coloring with great fidelity while their artistic character is guaranteed when we glance at the names of the artists.

As we read the text we marvel at the completeness of the author's mastery of the literature, and wonder if there is anything that he has overlooked. The account of the Mallard which comes first is virtually a scientific monograph of that species. In its synonymy, after the technical names, come the numerous vernaculars of English, French and German speaking peoples and one or more names in forty-two other languages. Then follow brief accounts of the haunts of the bird, its wariness, daily movements, gait, swimming and diving, perching, flight, sense organs, hearing, sight, touch, association with other species, voice, food, courtship, nesting status, enemies, damage, food value, domestication, hybrids and geographic races. The detailed descriptions cover all seasonal, sexual, and age conditions of plumage from downy young to adults. The

¹ A Natural History of | the Ducks | By | John C. Phillips | Associate Curator of Birds in the Museum | of comparative Zoology at Harvard College | with plates in color and in black and white | from drawings by | Frank W. Benson, Allan Brooks | Louis Agassiz Fuertes | and | Henrik Grönvold | Volume II | The Genus *Anas* | (vignette) | Boston and New York | Houghton Mifflin Company | The Riverside Press, Cambridge | 1923. Quarto pp. i-xii + 1-409, pll. 19-44; maps 28-65. Price \$50.00 per volume.

distribution of the species is given in most elaborate detail, first the breeding area, then the winter range and finally its occurrence in the "passage area," with a full discussion of its migration in various parts of the world. Its occurrence and relative abundance in every state, province or country is given with due mention of authority, while the major geographical divisions are carried as inserts in heavy faced type, to aid one in making use of the data. We have commented elsewhere on the use of the term "complete scientific account" but however we may regard it in other connections we think that it may safely be used in describing Dr. Phillips' work.

These large sumptuous bird books may be prepared in a variety of ways and for different classes, and the best sellers will naturally be those which aim to entertain the popular readers which constitute the great army of bird students today. Dr. Phillips makes no particular effort in this direction, stating his facts as briefly and concisely as possible in clear, plain language, ideal for a work of reference, and anyone interested in the Ducks must needs make *this* work his work of reference.

To illustrate the accuracy of its information and the need of consulting it the writer may state that he recently had occasion to look up the status of the European Widgeon in North Carolina and in the latest work on the birds of that state found but two records. Dr. Phillips, however, tells us that the species was not uncommon on Currituck Sound from 1897-1912 and that it was known from there as long ago as 1880.

This entire volume is devoted to the genus *Anas* which as conceived by the author includes the genera *Chaulelasmus*, *Eunetta*, *Mareca*, *Polionetta*, *Poecilometta*, *Nettion*, *Dafila*, *Dafilula*, and *Querquedula*. It is refreshing, in these days of hair splitting in genera, to find someone working in the other direction. It is interesting to see, moreover, that Dr. Phillips adheres for the most part to the sequence of species in Sharpe's 'Hand-List,' showing that no great violence is done by uniting these so-called genera; but the species of "*Polionetta*" are widely separated, showing that this group apparently was not a natural one.

The Texan Black Duck (*A. maculosa*) he regards as identical with the Florida bird (*A. fulvigula*) while Abert's Duck (*A. aberti*) he shows clearly is based on a female *A. wyvilliana*. One new name is proposed *Anas gibberifrons mathewsi* (p. 266) for *Nettion castaneum rogersi* preoccupied in *Anas*.

Compared with Sharpe's 'Hand-List' one species *A. drygalskii* is added and twelve subspecies, some tentatively, while all the forms in that work are recognized with the exception of the two above mentioned. "*Nettion salvadorii*" we presume is to be included elsewhere as we find no mention of it in the present volume.

Dr. Phillips' admirable work is one that should be in every Duck Club, in every museum, and in the library of every collector of notable bird books. It has the stamp of authority throughout, both as to text and plates.—W. S.

Thorburn's 'Game Birds and Wild Fowl.'—The collector of sumptuous works on ornithology must be delighted by the array of beautiful volumes that has recently been placed upon the market. Beside the two already noticed there is a third well worthy of the attention of the connoisseur in these works of art, and of the sportsman desirous of possessing notable works dealing with his pastime. This is Thorburn's 'Game Birds and Wild-Fowl of Great Britain and Ireland.'¹ It is a large quarto similar in style and binding to the same author's 'British Birds'² but slightly larger and includes beside the text thirty beautiful color plates by this famous artist-author representing fifty-eight species. He explains in the preface that it has not been his aim to make scientific plates of the species but to represent them grouped in their natural surroundings and his results are not only eminently successful from the sportsman's standpoint, but are beautiful contributions to art, with all the softness and effective color schemes characteristic of Thorburn's work which have been reproduced by the Sun Engraving Co. of Watford, England, with remarkable fidelity.

To give one an idea of the method of handling and grouping we may call attention to the frontispiece in which a group of five Mallards, male and female are resting and preening by a bunch of dead sedge on the marshy shore of a great river. On the left in the foreground are three Shovellers while other Mallards in mid-distance, and in the air, illustrate various poses and actions of the species. While a perfectly natural and restful group such as a lucky photographer might catch with his camera, a careful study reveals how many characteristic positions and activities of the birds the artist has depicted, and what care and thought he has given to the composition. Again we have the waters of some coastal bay with surf in the distance and in the foreground a gathering of six Scaup, eight Golden-eyes and five Long-tails, perfectly natural and yet illustrating a remarkable number of postures assumed by these birds. Another plate represents two Snipe—the Common and the Jack—at the edge of a sequestered pool surrounded by tall brown grass, each bird in a characteristic Snipe attitude. Then there is a mountain scene with bare rocky slopes and a rushing torrent near by and a group of eight Red Grouse in various attitudes, the females resting, and the old males alert and watchful, one of them with bill opened in full cry, while another plate of the same species shows a flock all on the wing, coming "down wind" against a stormy sky. So page after page these beautiful pictures of wild life delight the eye.

The text is well gotten up, based on personal experience and the writings

¹ Game Birds and Wild-Fowl of Great Britain and Ireland | written and illustrated by | A. Thorburn, F. Z. S. | containing thirty plates in colour, showing | fifty-eight species. | Longmans, Green and Co. | 39 Paternoster Row, London. | New York, Toronto, Bombay, Calcutta, and Madras | 1923. | All rights reserved. Large quarto (10.5 X 14.5 ins.) pp. 1-vii + 1-79, pl. 1-30. Price \$35, net, bound in red cloth with gold trimmings. (55 Fifth Ave., N. Y.)

² Noticed in 'The Auk' 1917, p. 221.

of well known authorities on the game birds while some valuable notes by Hugh Wormald on Duck plumages are made free use of. The accounts cover the distribution, habits, nesting, plumage variation, and methods of hunting, in a most satisfactory way and are beautifully printed on paper almost as heavy as that which supports the plates, making the handling of the pages very much easier.

The species included comprise all of the British Ducks, Geese and Swans, the gallinaceous birds together with the three Snipe, the Golden Plover, the Lapwing and the Curlew. The artist-author and the publishers deserve much praise for producing a remarkably beautiful and useful volume.—W. S.

Witherby's 'Practical Handbook of British Birds.'—This work¹ which has been appearing in parts ever since March 3, 1919, has been completed with the issue of Part XVIII (Vol. II, pp. 801-959) on February 26, 1924. This final part contains the conclusion of the Auks, and consideration of the Bustards, Rails, Cranes and Gallinaceous birds. Half of the text however is devoted to additions and corrections which bring the work up to the end of 1923 so far as information, nomenclature etc. are concerned; and a systematic list of British birds numbering 496 of which 208 breed or have bred in the British Isles during the past fifty years.

As completed the 'Handbook' is one of the most notable works on the birds of Great Britain that has yet appeared and the most complete technical account of the birds of any one country with which we are familiar. It presents all of the scientific facts concerning each species in concise form and clear language, without any attempt at popular writing or consideration of the habits, "life-history" or "character" of the birds. This latter phase of the subject is a perfectly legitimate and important one and has offered opportunity for the production of some of the finest pieces of ornithological literature but it is a field apart, and we think Mr. Witherby has done well to limit the present work to the hard facts of the science, as well as presenting these facts in language perfectly understandable by the laity. The reviewer has always contended that scientific facts may be presented without the use of technical language and still lose none of their force.

The generic and specific headings with their references and foot notes give one all the technical information on nomenclature contained in a

¹ A Practical Handbook of British Birds Edited by H. F. Witherby, M. B. E. F. Z. S., M. B. O. U. Editor of British Birds (Mag.). Authors of Various Sections: Ernst Hartert, Ph. D., F. Z. S., M. B. O. U., Annie C. Jackson, H. M. B. O. U. (Mrs. Melnertzhagen), Rev. F. C. R. Jourdain, M. A., M. B. O. U., H. F. A. O. U., C. Oldham, F. Z. S., M. B. O. U., Norman F. Ticehurst, O. B. E., M. A., F. R. C. S., M. B. O. U. and The Editor. Vol. I. With 17 Plates and Numerous Text Figures. Witherby & Co., 326 High Holborn, London. 1920 (pp. 1-viii + 1-532, text figures 117). Vol. II. With 13 Plates and Numerous Text Figures. 1924 (pp. 1-xii + 1-959, text figures 211). Price bound complete £4.10.0.

check-list with much additional explanation, while the keys and detailed descriptions covering all the known plumages make the identification of specimens an easy matter, the section on "measurements and structure" being particularly noteworthy in pointing out details too often omitted. The section on "field characters" describes the more prominent features by which the live bird may be recognized, while that on "characters of allied forms" points out the differences between the form under consideration and its nearest geographic allies, which not only enables one to see exactly the systematic status of the British species or race, as the case may be, but also to identify a possible extralimital straggler.

Under "breeding" facts of interest to the student of oölogy and of nesting activities are summarized with measurements and descriptions of eggs and data on the time of nesting, brooding and incubation period. The general character of the food of each species is stated and a list of the more important items including, in the case of *Raptores*, a list of the birds which each species is known to kill. The paragraphs on distribution give the character of occurrence both geographical and seasonal, as well as the relative abundance in the British Isles and "abroad."

The text figures illustrate structural characters of wing, tail, foot or bill with drawings of the heads of many species to aid in identification, while the full page plates, some of which are in colors, depict either very closely related forms or birds in the unfamiliar juvenal plumage.

An additional point which strengthens this work is the collaboration of the other notable authorities on British birds who have aided Mr. Witherby in the undertaking—Dr. Hartert, Mrs. Meinertzhagen, and Messrs. Jourdain, Oldham and Ticehurst. The work of a group of collaborators is necessarily more complete than that of any one individual.

It is difficult to over emphasize the importance of the 'Handbook' as a work of reference not only to the beginner but to the advanced ornithologist both of whom will find here the information of which they are in search.—W. S.

Görnitz on Feather Colors and Pigments.—Görnitz has published two papers which consider feather colors and pigments. The first paper¹ gives a good classification of feather colors. The original feature is a division of melanin pigments into two groups: eumelanins and phaeomelanins. Otherwise the classification is similar to that of other authors.

The other paper,² in the reviewer's judgment, is an important contribution to biological literature. It deals with some difficult problems of unusual interest. The eumelanins include the darker and much less soluble granular pigments of feathers, whereas the phaeomelanins are

¹ Versuch einer Klassifikation der häufigsten Federfärbungen. Von Karl Görnitz. *Jr. für Ornith.*, LXXI, 1923, Heft. 1. S. 127-131.

² Ueber die Wirkung klimatischer Faktoren auf die Pigmentfarben der Vogelfedern. Von Dr. K. Görnitz. *Jr. für Ornith.* LXXI, 1923, Heft. 4. S. 456-511. Taf. 7.

lighter in color and much more soluble. The latter show various shades of light brown and even orange ("rotgelb"). The orange colored melanins mentioned by the writer are, in the reviewer's judgment, better described as broken orange.

An iron reaction was obtained for some of this pigment, isolated from "rotbrauner" feathers. Eumelanin pigment treated with either chlorine or hydrogen peroxide was converted into a substance resembling eumelanin in color and solubility. This result led to the assumption that phaeomelanins may be oxidation products of eumelanins or represent a more advanced stage of oxidation. This is contrary to an opinion which has existed that darker melanins represent the more advanced oxidation such as is involved in the action of tyrosinase on tyrosin.

The chemical considerations are followed by a discussion of the effects of climate on feather colors. A large number of geographical variations of different species are compared from the standpoint of temperature and humidity. Here the author deals with the very difficult problem of the evolution of color patterns. Though numerous exceptions are encountered, the following conclusions are reached. First, that melanin pigment formation is increased by higher temperatures and decreased by cold, eumelanins being susceptible to extreme cold only. Second, dry climates show an increase in phaeomelanin formation and a decrease in the production of eumelanin.

The lipochromes also are treated. Zooxanthin shows a tendency to increase in warm climates and to decrease in very cold climates. Zoonerythrin was found to show little climatic variation, but a slight tendency to the same behavior is claimed. The color patterns of migrating species are influenced by the climate of their winter range, especially when the winter stay is a long one. The writer claims to have discovered an alkali solubility for lipochrome pigment. Boiling yellow feathers in a solution of sodium hydroxide resulted in a yellow color for the solution. A similar result was obtained for red lipochrome pigment. In the reviewer's judgment, the solutions obtained should have been tested for further evidence of actual lipochrome solution.

An old error occurs in both papers, i. e., the idea that white feathers owe their color to the entrance of air into the feather structure. (See Strong, 194).¹—R. M. S.

Thomson's 'The Biology of Birds.'—There have appeared in recent years a number of general works on birds, dealing with their structure and activities, such as those by Pycraft, Beebe, Evans, etc., not to mention the introductory chapters of the larger systematic works, and now Prof. Thomson presents his 'The Biology of Birds'² covering much the same ground but under a slightly different title.

¹ The Causes of Whiteness in Hair and Feathers, By R. M. Strong, Science, N. S., Vol. LIV., No. 1398, Page 356, October 14, 1921.

² The Biology of Birds. By J. Arthur Thomson, M. A., LL. D., Professor of Natural History in the University of Aberdeen. New York. The MacMillan Company. 1923. Pp. 1-436

This volume is most welcome, not only because it brings our knowledge of the subject more nearly up to date, but because the author, being a zoologist in the broader sense of the word, approaches his subject from a somewhat different point of view from that of the specialist in ornithology. He quite naturally considers birds as simply one of the groups of the animal kingdom, not as a subject apart, and brings into his discussions the work of authors with whose researches the ornithologist is often unacquainted, while he is able to draw upon his knowledge of other groups in treating the general problems and in making comparisons and deductions. Furthermore Prof. Thomson's well known ability to write of technical matters in a language and manner that are within the understanding of the laity, makes his work of peculiar educational value and furnishes us with a readable account of the present views of scientists upon such topics as migration, origin of sex, evolution of birds, instinct and intelligence, etc.

The extent of the author's knowledge of the literature of his subject is shown by the numerous references and quotations and the care with which he sets forth conflicting theories and experiments. It seems in all ways the best work of its kind that has yet appeared and one which every bird student who has the ambition to become an ornithologist should read and digest.

The chapter headings which give a good idea of the scope of the work are as follows: The chief characteristics of birds; external features biologically considered; adaptation of the bird's skeleton; the flight of birds; food: its capture and utilization; the internal economy of the bird's body; adaptation to haunts; migration; courtship and sex; birds' eggs; parental care and nest making; senses, instinct and intelligence; the pedigree of birds; birds and evolution; birds and the web of life.

The work of American authors seems to be thoroughly recognized which has not always been the case with British books. The work of Watson and Lashley on migration; of Whitman on inheritance in Pigeons and of Pearle, Riddle, Curtis, etc., on sex problems and egg development, all receive attention. In the bibliography however we find the names of but a very few Americans who will be recognized as ornithologists—Allen, Beebe, Coues, A. H. Clark, L. J. Cole, Lucas, Strong and A. H. Thayer, a commentary upon our neglect of the "biology" of birds in favor of the purely systematic study and field work. There is today, however, a marked reaction in this respect and more of our ornithologists are turning to the more general problems for the solution of which birds offer such wonderful opportunities.

The volume closes with a useful bibliography while the illustrations comprise eleven plates, one in colors, and fifty-nine text figures. It is difficult to detect any errors typographical or otherwise but we think that there has been a slip of the pen on p. 325 where *Cyanospiza* is referred to as a genus or Parrots.—W. S.

Mershon's 'Recollections of Fifty Years Hunting and Shooting.'

—We wish that all of the older men who hunted or fished in their earlier years would leave us records of their experiences. Not only are such records intensely interesting reading for all who love life in the "great outdoors", but they contain much valuable data on the habits and abundance of species now rare or gone forever. One of the most interesting of works of this kind is W. B. Mershon's 'Recollections'¹ which has recently been published by the Stratford Company of Boston.

Mr. Mershon's previous publication on the Passenger Pigeon is the recognized authority on that now extinct bird and in the present volume he includes such information about the Pigeon as he has secured since the issue of the earlier work. There is also an account of the last of the Turkeys in Michigan, his final specimen having been shot in 1886, and a description of the dance of the Sandhill Crane as witnessed in North Dakota in 1889. These are the most important ornithological contributions in the volume but chapter after chapter we are taken on one hunting trip after another, all replete with interest and information on the various game which constituted the object of the chase.

There are early accounts of Quail and Grouse shooting in Michigan when a party of five on three successive days shot 144 Ruffed Grouse and shipped to market 4000 in a single season. There were deer hunts in 1880 at a time when it was estimated that 70,000 deer were killed in Michigan in a year, and then the fitting up of an old circus car as a movable camp in which the author's party went to the Yellowstone for fish and game; to North Dakota and Saskatchewan for Geese and Ducks, when 163 Geese could be shot in a day by several gunners and when the splendid Whooping Crane could be seen almost daily. The slaughter mentioned above is cited by Mr. Mershon to show how market gunning affected the game supply, but as he truly says three-quarters of the country where game abounded was then inaccessible and the rest only visited by those who travelled on foot or horseback whereas now "roads and Fords" reach to the most secluded and remote spots and all the country is combed for game.

This is the sad part of the story but when we read it we should realize all the more clearly why bag limits and other restrictions are placed on the hunter of today—yet in spite of all this the game does not seem to be keeping up with the hunting.

Our thanks are due Mr. Mershon for this interesting book and we hope it may stimulate others to record their recollections. The publishers are to be congratulated upon a fine piece of book-making and printing.—W. S.

¹ *Recollections of My Fifty Years Hunting and Fishing.* By Wm. B. Mershon 1923. The Stratford Company, Publishers, Boston, Massachusetts. Pp. 1-iv. + 1-259. 21 half-tone plates. Price \$3.50, post paid \$3.65.

Holmer's 'Indian Bird-Life.'—The little book before us is another evidence of the spread of popular interest in birds—a brief treatise on the common birds of India, which the author tells us aims “to link the popular knowledge of a few birds . . . with the scientific knowledge which can cheerfully attack large classical volumes on ornithology.” “It is a book” he adds “to work with, a laboratory book where the laboratory is the open air.”

There are two parts treating respectively of the birds of the Plains and the birds of the Hills, the several chapters dealing with special groups or birds of special regions; while one explains the principles of classification. Appendices give a list of the commoner species of Indian passerine birds with page references to the ‘Birds of India’ by Oates and Blanford and tables of the characters of the families and orders.

To those who associate popular ornithology with America and England it seems strange to see a colored plate of a house and grounds with “Blue Jays” (= Rollers), Mynahs, Jungle Babblers, etc., as the common lawn birds, while in the trees rest Honey-suckers and Green Bee-Eaters.

This little book with its popular accounts of the birds will prove of much value in interesting English residents of India, and English speaking visitors, in the avifauna, and in giving the beginner what he desires by leading him to the more serious study of ornithology.—W. S.

Dr. Fox's 'Disease in Captive Wild Mammals and Birds.'—The work² of the pathological laboratory of the Zoological Society of Philadelphia for the past twenty years is well known. During this period no less than 1860 mammals and 3505 birds which died in the garden have had autopsies performed upon them and the results recorded while many pathological specimens have been prepared and preserved in the museum.

This work has been carried on by Dr. Herbert Fox, pathologist of the Society and his assistants, Drs. F. D. Weidmann and E. P. Corson-White. The portly volume which is now before us presents the materials thus obtained, systematically arranged and ably discussed by Dr. Fox, together with extracts from similar work by others and other matter calculated to make the volume more complete.

This important contribution to medical and zoological science not only shows just what diseases occur in captive animals but presents data, the application of which will undoubtedly help to explain some of the patho-

¹ *Indian Bird-Life*. By M. R. N. Holmer. Humphrey Milford. Oxford University Press, London, Bombay, Calcutta, Madras. 1923. Pp. 1-ix + 1-100. Price, \$1.20. Oxford University Press, America Branch, New York.

² *Disease in Captive Wild Mammals and Birds*. By Herbert Fox, M. D., Pathologist to the Zoological Society of Philadelphia, Director of the William Pepper Laboratory Clinical University of Pennsylvania. With a foreword by Charles B. Penrose, President of the Zoological Society of Philadelphia. Philadelphia, London and Chicago. J. B. Lippincott Company. Pp. 1-vii, 1-665 (3). 1923. Price \$12.00.

logical states in domestic animals and in man. With the knowledge which it presents, moreover, intelligent experiments may be made to counteract the effects of diseases in zoological gardens and eliminate them as far as possible. To quote Dr. Penrose's "foreword" "Though the object of the work was the pursuit of knowledge for its own sake, yet results of practical value have followed: hygiene has been improved; disinfection has been made scientific; epidemics have been arrested; some diseases, notably tuberculosis in monkeys, and spiropteriasis in parrots, have been practically eliminated." Moreover, the keepers of the Philadelphia Zoo have taken renewed interest in the care of the animals with the knowledge that this constant effort to determine the cause of death, and to prevent its recurrence, is being carried on.

The major part of Dr. Fox's volume discusses the diseases of the various organs from the standpoint of the pathologist and is necessarily largely technical. Besides describing the conditions of a disease he points out which groups of animals are especially susceptible to it and which are apparently immune. There are successively considered diseases of the heart, blood vessels, bone and marrow, lymphatic tissues, respiratory, alimentary and urinary tracts, male and female reproductive organs, ductless glands, skeleton and central nervous system, constitutional diseases, relation of diet to disease (by Dr. Corson-White), neoplasms, infectious diseases and animal parasites (by Dr. Weidman).

This portion of the work will form a most valuable source of reference for the members of the medical profession interested in tracing the history of a disease through the vertebrates lower than man, as well as to the keepers of zoological gardens and the breeders of wild or domestic animals. Of more interest to the general reader, however, are the "foreword" by Dr. Penrose and Dr. Fox's introduction. There is here presented a summary of the general effects of captivity on wild animals and the physical and mental disarrangements which they undergo:—the sometimes fatal results of nostalgia which is common to many animals; the unnatural habit of killing young or mates; the killing of diseased animals by their healthy companions; self mutilation, etc. Birds are said to suffer less than mammals from the psychological effect of captivity, their mental development being much lower. With few exceptions (as the Ruffed Grouse) they accept captivity easily and become tame, and if the aviaries be bright and cheerful with plenty of sun all of the inmates seem to thrive and are happy, which is quite the reverse in dark, dull houses.

Dr. Fox points out that among birds quite distinct differences in some pathological processes occur, not only from the mammals but also within the class, while their response to infection he thinks may to some extent depend upon differences in anatomy. In regard to the high death rate in zoological gardens among recently received animals, which reaches 33% to 50% in the first six months in the London Zoo, Dr. Fox says that while failure to become acclimatized undoubtedly accounts for some cases of death, there are other factors to consider—infection in the wild, or in

transit, in the hold of a vessel or in a railway car, or in quarantine or in dealers' establishments. It is also pointed out that the seemingly high death rate in captivity is not as great relatively compared with wild animals as we might suppose, as in the case of wild animals at large we rarely or never see the sick individuals.

Dr. Fox and the Zoological Society are to be congratulated upon producing what is apparently the most important work of its kind and one which, as already pointed out, will be of service in many different ways as a work of reference.—W. S.

Mathews' 'The Birds of Australia.'—The last issue of this work¹ completes the Tree Creepers and covers the White-eyes and part of the Flowerpeckers. The six plates are by Grönvold and are up to the average of the work. The only new form that we notice in this instalment is *Zosterops lateralis investigator* (p. 153) from New Zealand, where it is said to have arrived from Australia and was supposed by Mr. Mathews to be identical with the Tasmanian form, but he now thinks it desirable to name it in order to "attract attention to the fact that a distinct form appears to be evolving."—W. S.

Chapman on New South American Birds.—Fifteen new forms are named in this paper² as a result of comparisons of material already on hand with recently acquired collections from eastern Ecuador containing topotypes of many "Napo" species. The new forms are: *Crypturus soui nigriceps* (p. 1), Upper Rio Suno, Ecuador; *Ortalis guttata caquetae* (p. 2), Caqueta, Colombia; *Trogonurus temperatus* (p. 2), Laguneta, Colombia; *Curucujus melanurus pacificus* (p. 4), Loja, Ecuador; *Andigena hypoglaucus lateralis* (p. 5), Junun, E. Peru; *Hypozanthus rivoltii meridae* (p. 6), Merida, Venezuela; *H. r. quindiuna* (p. 6), Laguneta, Colombia; *Chloro-nerpes rubiginosus coloratus* (p. 8), Chaupe, N. Peru; *Veniliornis dignus baezae* (p. 8), Baeza, Ecuador; *Myrmopagis ornata saturata* (p. 9), Upper Rio Suno, Ecuador; *Formicarius analis zamorae* (p. 9), Zamora e. Ecuador; *Hylopezus dives caquetae* (p. 10), Caqueta, Colombia; *Grallaricula peruviana* (p. 11), Chaupe, Peru; *Melanodera xanthogramma barrosi* (p. 12), Acan-cagua, Chile; *Philydor montanus yungae* (p. 12), is proposed for *P. m. bolivianus*, preoccupied.—W. S.

Stresemann on New Guinea Birds.—Dr. E. Stresemann has prepared a report³ on the ornithological results of Dr. Bürgers' collecting in the

¹ The Birds of Australia. By Gregory M. Mathews. Volume XI, Part 3. H. F. & G. Witherby, 326 High Holborn, London, W. C. 1, December 27, 1923.

² Descriptions of Proposed New Birds from Venezuela, Colombia, Ecuador, Peru, and Chile. By Frank M. Chapman. Amer. Mus. Novitates, No. 96, November 19, 1923, pp. 1-12.

³ Dr. Bürgers' ornithologische Ausbeute im Stromgebiet des Sepik. Ein Beitrag zur Kenntnis der Vogelwelt Neuguineas. Von Dr. Erwin Stresemann. Abdruck aus dem 'Archiv für Naturgeschichte' 1923, Abt. A. heft 7 und 8. Berlin, pp. 1-96, 1-92.

Sepik Valley, German New Guinea, consisting of an annotated list of 369 species with a summary of previous expeditions, a list of the ornithological contributions relating to this country and a discussion of its faunal divisions.

Under each species are listed all of the subspecies with their distribution and reference to place of description, the race or races represented in the collection under discussion being printed in heavier type, so that the work is far more than a report on the collection and serves as an important contribution to our knowledge of New Guinea birds. There appear to be no new forms described.—W. S.

Riley and Richmond—A Bibliography of Chinese Birds.—This list¹ which contains the titles of some 700 papers dealing with Chinese birds while admittedly not complete is evidently sufficiently so to be of the greatest value to those who have to deal with the avifauna of China which is for the most part scattered in various journals. As always in cases of compilation of this kind we are much indebted to the authors, how much only those who have attempted similar compilations will appreciate.—W. S.

Rothschild on Birds of Yunnan.—This paper² is a report on a third collection made by Mr. George Forrest in North-west Yunnan, a very fine collection according to the author, with a magnificent series of game birds. There were 1172 specimens representing 198 species of which 13 were not previously obtained by Mr. Forrest. *Cephalopyrus flammiceps olivaceus* (p. 263) is described as new.—W. S.

Wetmore on the Food of Grebes.³—After a careful study of the stomach contents of all six of our North American Grebes, Dr. Wetmore concludes that none of them is really injurious although the Pied-billed Grebe when it visits fish ponds may do damage by devouring young fish and in such cases it should be driven away or killed. The food of the larger Grebes consists largely of fishes of little or no value to man while the smaller kinds eat various sorts of water beetles and other insects found alive or floating on the surface of the water and all Grebes destroy crawfish.

Dr. Wetmore describes the mass of feathers which is almost invariably found in the stomach of Grebes. It consists of feathers which are dislodged when preening and devoured. He suggests that this feather mass

¹ A Partial Bibliography of Chinese Birds. By J. H. Riley and Dr. C. W. Richmond of the Smithsonian Institution. Journal of the North China Branch of the Royal Asiatic Society, Vol. LIII—1922, pp. 196–237 and LIV—1923, pp. 225–226.

² On a Third Collection of Birds made by Mr. George Forrest in North-west Yunnan. By Lord Rothschild, F. R. S. Novitates Zoologicae, XXX, pp. 247–267, October, 1923.

³ Food and Economic Relations of North American Grebes. By Alexander Wetmore. U. S. Dept. of Agriculture, Department Bulletin No. 1196, January, 1924, pp. 1–24.

may act as a strainer to prevent hard portions of food, bones and chiton, from passing into the intestines until softened by digestion. Grebes which feed on hard substances have more feathers in the stomach and those which contain soft food have less. The great destruction of Grebes for millinery purposes prior to 1903 is also referred to though at the present time Dr. Wetmore thinks that these birds have largely recovered from this slaughter. Now, however, they face a more dangerous condition in the extensive draining of marsh lands and ponds which if not checked will drive away or exterminate many of our birds.—W. S.

Wetmore on Fossil Birds.—Collections in the American Museum of Natural History and Princeton University, and the private collection of Mr. Harold J. Cook, all from the Miocene and Pliocene of Sioux County, Nebraska, have recently been studied by Dr. Wetmore¹ and have yielded six new species: *Geranoaëtus conterminus* (p. 497); *G. contortus* (p. 492); *Ortalis phengites* (p. 487); *Buteo typhoius* (p. 489); *Urubitinga enecta* (p. 500); *Proictinia efera* (p. 504), other bones being indeterminate.

Another collection² made by Dr. J. W. Gidley in the Pliocene of the upper San Pedro Valley, Cochise Co., Arizona, also submitted to Dr. Wetmore, contained a number of interesting specimens, among others a bone which is identified with the genus *Agriocharis*, the Ocellated Turkey, also a Grebe, a Teal, a Bobwhite, a Gallinule, a Crow, a Junco, and the following new species: *Chloroenas micula* (p. 13); *Dendrocygna eversa* (p. 3); *Branta minuscula* (p. 6); *Micropalama hesternus* (p. 11).—W. S.

Recent Papers by Mailliard.—An expedition sent out by the California Academy under the leadership of Mr. Joseph R. Slevin to the Gulf of California made a collection of birds' eggs and secured a few bird skins and Mr. Slevin made a number of ornithological entries in his note book, all of which were used by Mr. Joseph Mailliard in preparing an account³ of the birds of the expedition, which consists mainly of descriptions of the series of eggs secured and a list of 32 species observed with dates and localities. A general account of the expedition will be found in Vol. XII, No. 6, of the 'Proceedings' of the Academy.

Another paper⁴ by Mailliard describes the birds and mammals seen and obtained on a second trip to Siskiyou County, California. One of the objects was to determine which race of Fox Sparrow, if any, bred in the mountains west of Shasta Valley and specimens showed it to be *Pas-*

¹ Avian Fossils from the Miocene and Pliocene of Nebraska. By Alexander Wetmore. Bull. Amer. Mus. Nat. Hist., XLVIII, Art. XII, pp. 483-507, December 3, 1923.

² Fossil Birds from Southeastern Arizona. By Alexander Wetmore. Proc. U. S. Nat. Museum, Vol. 64, Art. 5, pp. 1-18, 1924.

³ Expedition of the California Academy of Sciences to the Gulf of California in 1921. Birds. By Joseph Mailliard. Proc. Calif. Acad. Sciences, Fourth Series, XII, No. 24, pp. 443-456, August 21, 1923.

⁴ Further Notes on the Birds and Mammals of Siskiyou County, California. By Joseph Mailliard. Ibid, XIII, No. 3, pp. 7-28, September 13, 1923.

serella iliaca mariposae with some tendency toward *brevicauda*. Many other local notes of interest are contained in the paper.

A third contribution¹ deals with the autumn work of the ornithological department of the Academy in Plumas and Yuba Counties in 1922.

Casey Wood's 'The Birds of Fiji.'—Dr. Casey A. Wood who has been travelling widely during the past few years spent some time in Fiji and became quite well acquainted with the avifauna of the islands. In the 'Handbook of Fiji, 1924', we find eight pages devoted to an account² from his pen of the bird life. We learn that there are about 115 species including introductions and migrants, but that this is in spite of the Indian Mongoose and the Mynah, both serious enemies of the native birds and the activities of men in cutting down forests, draining swamps, and burning over cane and brush. It seems to be the same story everywhere and in some of these formerly out of the way spots the native fauna will be gone before we know it.—W. S.

Forbes and Gross on Distribution of Illinois Birds.³—This paper is supplementary to one published previously on 'The Numbers and Local Distribution in Summer of Illinois Land Birds of the Open Country,' and attempts to cover in the same way the birds of winter, spring and fall seen in the open country. It is one of those papers which might be classed as ornithological mathematics dealing largely with figures and percentages. Various trips taken across southern, central and northern Illinois from November to February in the winter of 1906-7 furnish the data for the winter estimates. It seems that 6378 acres were covered in the work and 5193 birds counted or 520 to the square mile as against 644 in the summer. The most abundant winter birds of the open ground were in order of abundance: Crow, Lapland Longspur, Junco, Prairie Horned Lark, English Sparrow and Goldfinch. In the southern section the order was Junco, Meadowlark, Quail, Bluebird, Mourning Dove and Blue Jay; in central Illinois: Crow, Prairie Horned Lark, English Sparrow, Goldfinch, Junco and Tree Sparrow, and in the northern section: Lapland Longspur, Crow, Goldfinch, Tree Sparrow, Prairie Horned Lark and English Sparrow.

The species are then considered with reference to habitat and figures given for fields planted to corn and wheat, stubble, ploughed ground, etc. Then the spring and fall birds are tabulated in somewhat the same way, and there is a table on which all of the species identified during the study are entered with the character of their occurrence in each of the three

¹ Field Work in Plumas and Yuba Counties, California, in 1922. By Joseph Mailliard. Ibid., No. 4, October 15, 1923.

² The Birds of Fiji. By Casey A. Wood, M. D. Reprinted from the Handbook of Fiji, 1924.

³ On the Numbers and Local Distribution of Illinois Birds of the Open Country in Winter, Spring and Fall. By Stephen A. Forbes and Alfred O. Gross. Bulletin Illinois Natural History Survey, XIV, Art. X, October, 1923, pp. 397-453.

sections. This paper is a very important one and much valuable data can be obtained from the figures and grouping, both economic and distributional.—W. S.

Birds as Factors in the Control of the Fall Webworm.—Dr. John D. Tothill, whose preliminary papers on the natural control of the fall webworm (*Hyphantria cunea*) have already been noticed in 'The Auk' (25, No. 2, April 1918, p. 252) is doing the best work the reviewer is aware of in bringing to light the actual effect upon insects of the feeding habits of birds.

The present comprehensive report¹ details the results of eight years' study of the fall webworm in New Brunswick, and of shorter periods in Nova Scotia and British Columbia. Careful account was kept each year of the percentage of destruction of the pest by various agencies, and it was found that Red-eyed Vireos destroyed from 11.4 to 89.5 per cent of the broods, averaging more than 68 per cent, far more, of course than any other agency. As a test case 382 caterpillars were placed on a tree and in 9 days the birds had taken all but 6 that had been parasitized. The work of the birds naturally was most effective when the webworm was scarce and in some years it seemed scarcely a worm escaped the Vireos. The insect seemed clearly doomed to local extinction when a flight of adult moths from a distance repopulated the district. In summing up his observations Dr. Tothill refers to the "tremendously important part played by the Vireos in Eastern Canada, and by undetermined birds in British Columbia," and concludes: "They are of least importance when the host insect is very abundant; of greatest importance when the webs are very scarce; and they share with the parasites the task of maintaining a stabilized control when the insect is just moderately abundant. Without the birds, the parasites would not maintain a control . . . and the converse is also true." With their record of destroying 68 per cent of the broods, on the average, the reviewer feels this summary is by no means over-generous to the birds. He wonders also why birds other than Vireos escaped observation as enemies of the webworms. In New Brunswick, Cuckoos, the Baltimore Oriole, and some of the Warblers almost certainly do prey upon these larvae.—W. L. M.

Birds in Relation to Poison Oak.—In a book entitled 'Rhus Dermatitis' (June 1923), Prof. James B. McNair has several items dealing with the relations of birds to *Rhus diversiloba*, the western poison oak. First a list of localities where birds which had eaten the fruit were collected is given in the chapter on distribution of the plant, next a table showing the months in which the fruit has been found in the stomachs of California birds, and finally a graph showing the number of species of birds feeding

¹ Bul. 3, n. s. Dominion Dept. of Agriculture, Ottawa, 1922, 107 pp. 99, figs., 6 pls.

on the fruit in each month. All of these items were derived from data furnished by the Biological Survey. It is shown that there is a decrease in toxicity of the fruit to man with ripening, but no assumptions bearing on bird food should be made on that account. The data given of frequency of occurrence of poison oak berries in bird stomachs seem merely to reflect availability.—W. L. M.

The Ornithological Journals.

Bird-Lore. XXVI, No. I. January-February, 1924.

Some Birds of the San Gabriel Wash. By Robert S. Woods. With excellent photographs of southern Californian birds.

A Cedar Waxwing Patient. By Mr. and Mrs. F. D. Hubbard. An interesting X-ray photograph of the living bird showing a fracture of the humerus.

The Christmas bird lists are as numerous and interesting as ever, covering all parts of the United States and Canada as well as Porto Rico and Ceylon.

The Educational Leaflet by T. Gilbert Pearson treats of the Loggerhead Shrike with a colored plate by Allan Brooks.

The Condor. XXV, No. 6. November-December, 1923.

The Buff-breasted Flycatcher in the Huachucas. By Frank C. Willard.

Further Observations on the Costa Hummingbird. By Robert S. Woods.

The Cayenne or River Ibis in British Guiana. By Casey A. Wood.

The Phonetics of Bird-sound. By Richard Hunt.—A system based on phonetics. The phonetic elements in bird song are divided into four classes, the vowel sounds, the explosives, the fricatives and the musicals.

A Study of Some Plumages of the Black Tern. By A. J. VanRossem.—The author concludes that two years are necessary to attain the black adult plumage, the first spring plumage being a mottled one somewhat resembling the molting adult in autumn.

The Systematic Status of Some Northwestern Song Sparrows. By Harry S. Swarth.—This is a paper well worthy of special study. The writer rejects two races "*inexpectata*" and "*phaea*" and regards all British Columbian Song Sparrows as belonging to two races *rufina* of the Queen Charlotte Islands, and *morphna* of Vancouver Island and the mainland. That there are variations in the latter which some might regard as subspecies the author admits, but he thinks that they are not subspecies in the sense that the others mentioned are. He makes a plea for laying stress upon the major divisions of a variable group like the Song Sparrows and thinks that observed differences within each of these larger divisions should be regarded in a somewhat different light, and that this principle be carried out in our 'Check-List.'

Mr. Swarth is here advocating exactly the same principle that the reviewer has pled for in the case of genera. "All recognizable subspecies

are not equidistant from one another," he says, "and they should not be treated as if they were," and this is equally true of a genera.

The Condor. XXVI, No. 1. January-February, 1924.

Notes on the Life History of the Texas Nighthawk. By Robert S. Woods.—As observed and photographed in the San Gabriel Wash, Los Angeles Co., Calif.

Changing Habits of Vaux Swift and Western Martin. By William L. and Irene Finley.

Autobiography of Joseph Mailliard.—An interesting paper dealing with the earlier days of California collecting.

The Wilson Bulletin. XXV, No. 4. December, 1923.

Notes on the Nesting of the Wilson's Snipe. By George M. Sutton.—In Crawford County, Pennsylvania. A most interesting discovery adding another nesting species to the state list.

Some Birds of the Ozark Region. By Johnson A. Neff.—An important annotated list.

Identifying Birds Afield. By A. F. Ganiel.—An exploitation of the value of characteristics, mannerisms, habits and habitats in identifying birds in the field, which the writer regards as more important than color keys or vocal efforts. While we agree with all he says it seems to us that the instantaneous identification of birds by experienced field students is a complex process hard to analyse but acquired by long experience, just as we can instantly recognize a relative or friend without being able to say just how we do it.

The Oölogist. XL, No. 11. November, 1923.

Nesting of the Caspian Tern and the Snowy Heron. By R. W. Shufeldt.—Explanation of two photographs by E. A. McIlhenny with an advertisement of the "Louisiana Gulf Coast Club" the organization of which most bird and game protective organizations have strenuously opposed.

Recent Expedition to Los Coronado[s] Islands. By Alfred Cookman.

Nesting of the Broad-winged Hawk. By A. D. Henderson.—In Alberta.

The Oölogist. XLI, No. 1. January, 1924.

The American Golden-eye. By A. D. Henderson.—Nesting in Alberta. Mexican Jacana. By J. Warren Jacobs.—Description of a series of six sets of eggs.

Materials of a Kingbird's Nest. By C. M. Brooks.

The Cardinal. No. 3. January, 1924.

The Life Zones of Western Pennsylvania. By W. E. Clyde Todd.

Passenger Pigeon Reminiscences. By John C. Anderson.

Bewick's Wren in Allegheny County [Penna.]. By Bayard Christy.

The Blue Goose Expedition. By G. M. Sutton.—Carnegie Museum Expedition to James Bay. A list of the species obtained is given.

The Ibis. (11th series) VI, No. 1. January, 1924.

On the Birds collected in North-western and Northern Cameroon and Parts of Northern Nigeria. By George L. Bates.—This instalment of this paper consists of a most interesting itinerary with notes on the birds encountered.

A List of the Birds of Macedonia. By William E. Glegg.

An Account of a Journey across the Southern Syrian Desert from Amman in Transjordan to Ramadi on the Euphrates. By Col. R. Meinertzhagen.

Some Notes on Birds found breeding in the Neighborhood of Aleppo in 1919. By G. von H. Clarke.

The Birds of Sind. Part VII. By C. B. Ticehurst.

The Disappearance of the Pink-headed Duck. By Sir John A. Bucknill.
—Little doubt of its virtual extinction.

Fourth Report of the Committee on the Nomenclature and Records of Occurrences of Rare Birds in the British Islands and Certain Necessary Changes in the Nomenclature of the B. O. U. List of British Birds.—Actions affecting the A. O. U. List are the substitution of *Melanitta* Boie for *Oidemia* Fleming and the rejection of the proposal to adopt *Erythrina* Brehm for *Carpodacus*, one of Brehm's species being a nomen nudum and the other not definitely identifiable.

There is an obituary with portrait of Count Tommaso Salvadori.

Bulletin of the British Ornithologists' Club. CCLXXXII.
December 8, 1923.

Dr. Hartert discussed variation in *Tchitrea*, a subject that has attracted much attention from various ornithologists from the time of Cassin.

Mr. Bannerman presents remarks on the genera *Turdinus* and *Alcippe*. The former is restricted to the Malay region, Java, etc., while the African species usually placed in it belong in *Illadopsis*. *Alcippe* is likewise restricted to Indian species, the African ones along with *T. atriceps* belonging together in *Pseudalcippe* (p. 26) here proposed as new. Several new forms are described from India, Cameroon and Yunnan.

Bulletin of the British Ornithologists' Club. CCLXXXIII.
January 5, 1924.

Count Gyldestolpe describes a new Fruit Pigeon *Treron calva vylderi* (p. 36) from Great Namaqualand.

Mr. Stuart Baker discusses the races of *Cisticola exilis*, *C. e. equicaudata* (p. 39) being described as new from Siam. He also proposes *Franklinia rufescens austeni* (p. 39) from the Naga Hills, and Mr. Bannerman *Zosterops vaughani* (p. 41) from Pemba Island. Col. Meinertzhagen in discussing the races of Song Thrush states that the bird of the Hebrides is darker than the mainland form corresponding with the greater rainfall but that of Ireland where the rainfall is also heavy does not show the same tendency. He also points out that in the Hebrides the Song Thrush is a heather and ground-frequenting bird while in Ireland it is seldom found far from bushes

Whether it is this difference in habit or the amount of rainfall which affects the coloration, he considers it due to environment and not to mutation while, "in closely allied species variation appears to follow the principles of mutation."

Bulletin of the British Ornithologists' Club. CCLXXXIV. January 24, 1924.

Col. Meinertzhagen describes two African Kingfishers, *Corythornis cristata johannae* (p. 41), Comoro Isls. and *Halcyon senegalensis ranivorus* (p. 41), Mombasa; and Nagamichi Kuroda, *Yungipicus pygmaeus tonkinensis* (p. 47), Tonkin.

British Birds. XVII, No. 8. January, 1924.

The Early History of the Mute Swan in England. By N. F. Ticehurst.
Some Breeding Habits of the Swallow and House-Martin. By R. H. Brown.

British Birds. XVII, No. 9. February, 1924.

Surry Field Notes. By P. F. Bunyard.

Nest Building of the Long-tailed Tit. By R. H. Brown.

Avicultural Magazine. (Fourth Series) I, No. 11. November, 1923.

A Young Gray Parrot. By Beatrice Cook.—Reared in captivity with account of down plumage.

The Tanagers. By J. Delacour. With a colored plate of three "Calistes."

In the December issue it is announced that the Marquess of Tavistock will assume the editorship of the journal with the beginning of 1924.

The Oölogists' Record. III, No. 4. December 1, 1923.

An Account of the Gannets on Grassholm Island, off Pembrokeshire. By Capt. V. Hewitt.—An excellent paper with photographic illustrations.

Egg-Collecting. By E. C. Stuart Baker.—Gives his views on this much mooted question. Incidentally he quotes a famous British ornithologist that: "Oölogists can be counted on the fingers of one hand; collectors are countless." Mr. Baker would not include among oölogists the vast majority of collectors but would extend the bounds to take in "those collectors who try to be oölogists."

He says further that oölogists should live up to the principle: "Never take an egg unless it is wanted for some definite purpose and never encourage youngsters to take eggs unless you are in a position to teach them something about the eggs taken."

The South Australian Ornithologist. VII, Part 4. October 1, 1923.

Birds of South Australia. By J. Sutton.—A nominal list of 356 species following the nomenclature of the R. A. O. U. List.

The Emu. XXIII, Part 3. January, 1924.

Heterochrosis in the Crimson-breasted Parrot, *Pyrrhulopsis splendens*.

By Casey A. Wood.—Description of a bird which was becoming yellow over most of the green and red areas and white on the blue wings and tail.

Royal Australasian Ornithologists' Union's 22nd. Annual Congress.

Domestic Cats Gone Wild versus Bird Protection. By A. J. Campbell.—These animals have become distributed all through the continent and are almost as universal as the dingo.

Notes on Extinct or Rare Australian Birds with Suggestions as to Some of the Causes of their Disappearance. By Edwin Ashby.—This instalment deals mainly with Parrots.

Relationships of Tasmanian Birds. By Robert Hill.—With maps showing distribution of various species.

Notes on the Early Nesting and Range of Birds near Hobart. By M. S. R. Sharland.

Bird Observations made by Delegates to the Tasmanian R. A. O. U. Camp-Out. By J. N. McGilp and F. E. Parsons.

Does Tasmania Possess a Second Species of Blue Wren (*Malurus*)? By Miss J. A. Fletcher.

Historical Associations of Adventure Bay. By Clive Lord.

White's Journal of a Voyage to New South Wales. By W. B. Alexander.

Singular Nesting Sites of Birds of the Nullarbor Plain. By E. L. G. Troughton.

Birds of the Broom Hill District. By Tom Carter.

Obituary of W. H. Dudley LeSouef.

Revue Francaise d'Ornithologie. 15. No. 175. November 7, 1923. [In French.]

Notes on Some Birds of the Pacific Ocean. By M. de la Touche.—San Francisco to Shanghai.

Ornithological Trips in the Region North of the Sahara. By H. deBalzac.—Continued in December and January issues.

List of the Birds Observed in the Department of the Maritime Alps. By Commandant Caziot.

Revue Francaise d'Ornithologie. 15. No. 176. December 7, 1923. [In French.]

Observations on the Nidification of *Lophoceros nasutus* of Senegal. By Dr. Millet Horsin.

The Bank Swallow. By M. Bon.

A Contribution to the Study of the Costa Creeper. By H. Jouard.—On the validity of *Certhia familiaris costae* Bailey, 1847. (Continued in January issue.)

Revue Francaise d'Ornithologie. 15. No. 177. January 7, 1924. [In French.]

On the Birds of the Maritime Alps. By L. Lavauden.

On the Purple Heron of the Camargue. By A. Gibert.

L'Oiseau. IV. Nos. 8, 9, 10, 11. August to November, 1923. [In French.]

Contains accounts of the Weaver Finches by A. Decoux with plates; the Tanagers and Honey Creepers by J. Delacour; and the Finches by A. G. Butler; forming parts of the general work on cage birds started some time ago.

There is also an article on American Parroquets by J. Berlioz (August), and one on Birds of Cleres in 1923 by J. Delacour. (November).

Le Gerfaut. 13. Fasc. III-IV. 1923. [In French.]

Some Nests found in the Forest of Bouillon in 1922. By C. Dupond.

Ardea. XII, No. 2. December, 1923. [In Dutch.]

Some Observations on the Bittern. By C. G. B. ten Kate.

Notes on North American Birds. By F. E. Blaauw.

Revista Italiana di Ornithologia. VI, No. 1. June, 1923. [In Italian.]

On the Partridge of Cirenaica. By A. Ghighi.—*Alectoris barbata* Reighw. Birds Observed during an Oceanographic Expedition on the Sea of Levant. By E. Ninni.

Unusual Birds at Malta. By G. Despott.

Anser albifrons in Sicily. By A. Trischitta.

Ornithologische Beobachter. XXI, No. 1. October, 1923. [In German.]

The Cirl Bunting (*Emberiza cirlus*). By H. Fischer-Sigwart.

The Cirl Bunting. By A. Felix.

Ornithologische Beobachter. XXI, No. 2. November, 1923. [In German.]

Ornithological Observations in the Region of the Bosphorus. By A. Mathey-Dupraz (Continued in December and January).

Ornithologische Beobachter. XXI, No. 3. December, 1923. [In German.]

The Golden Eagle. By K. Daut.

Sixth Report on the Work of the Central Station for Bird Ringing in Bern, 1922. By A. Hess. (Continued in January.)

Ornithologische Beobachter. XXI, No. 4. January, 1923. [In German.]

Storks in Zoological Gardens. By A. Wendnagel.

Journal für Ornithologie. 72 Heft. 1. January, 1924. [In German.]

Seventh Report on Bird Observations at Heligoland. By Hugo Weigold. Russian Ornithological Work during the past Year. By Hans Johansen.

Mutation Studies. By E. Stresemann.

On the African Species of *Terpsiphone*. By E. Stresemann—Recognizes *T. rufiventris* (with 7 forms); *tricolor*, *rufocinerea* (including *batesi*) and *viridis* with 4 forms.)

Are there two species of *Podica*? By E. Stresemann.—*P. senegalensis albipectus* (p. 97) described as new from Loango.

Two cases of Occurrence of *Fulmarus glacialis* in the interior of the European Continent. By J. Michel and O. Reiser.

A New African Fruit Pigeon. By M. Grote.—*Treron calva granviki* (p. 102), Ukerewe Isle, Victoria Nyanza.

A South-east North-west Migration Route through the Sahara. By Geyer van Schweppenburg.

The Violet Color of Bird Feathers. By K. Görnitz and B. Rensch.

The Development of Young *Cariama*. By O. Heinroth.

Obituary of T. Salvadori. By E. Hartert.

Ornithologische Monatsberichte. 32, No. 1. January–February, 1924. [In German.]

Observations on a Mixed-Singer *Certhia familiaris* × *brachydactyla*. By L. Dobbrick. (See also p. 13–14.)

On *Accipiter castanilius* Bon. By E. Stresemann.

The Subspecies of *Phylloscopus trochiloides* and *P. davisoni*. By E. Stresemann. Four races of one and five of the other and two of *P. ricketti* recognized.

Anthreptes longuemarei savannarum (p. 13) n. subsp. Buala-Uam, eastern Cameroon. By H. Grot.

Terpsiphone mutata voeltzkowiana (p. 18) n. subsp. Moheli. By E. Stresemann.

Norsk Ornithologisk Tidsskrift. No. 1. 1920–21. [In Norwegian.]

A Tabular View of Norwegian Birds. By H. T. L. Schaanning.

Nature Conservation and Bird Life in Denmark and Sweden. By H. Broch.

Bird Ringing. By H. T. L. Schaanning. (Continued in No. 2.)

Norsk Ornithologisk Tidsskrift. No. 2. 1921–22. [In Norwegian.]

Goshawk Nesting on the Ground. By Hals.

The Birds of Oplands, southern Norway. By H. T. L. Schaanning.

Norsk Ornithologisk Tidsskrift. No. 3. 1922–23. [In Norwegian.]

A new race of *Lyrurus tetriz*. By H. T. L. Schaanning *L. t. bjerkreimensis* (p. 151) from southern Norway.

Other articles by the same on Migration of Norwegian birds and a criticism of Collett's 'Birds of Norway' both of which are also considered in previous numbers.

Norsk Ornithologisk Tidsskrift. No. 4. [In Norwegian.]

A Comparison of the Arrival of Birds and Flowering of Plants. By A. Moe.

Bird Sanctuaries in Norway. By F. Nansen.

Additional articles by Schaanning on Migration and on *Lyrurus*.

Ornithological Articles in Other Journals.

Stenhouse, J. H. Bird Notes from Fair Isle, 1923. (Scottish Naturalist, November-December, 1923.)

Baxter, Evelyn V. and Rintoul, Leonora J. The Spread and Distribution of the Woodcock as a Breeding Bird in Scotland since the Beginning of the Nineteenth Century. (Ibid.)

Townsend, C. W. Notes on the Birds of Grand Manan, New Brunswick. (Canadian Field-Naturalist. (November, 1923.)

Magee, M. J. Bird Notes from the North Shore of Lake Superior, near Gorgantua, Ontario. (Ibid.)

Munro, J. A. The Necessity for Vermin Control on Bird Sanctuaries. (Ibid.)—The writer contends that Crows, Hawks and other predatory species were necessary in the past to keep species from increasing too rapidly and to kill off weaklings, but that now telephone wires, plate glass windows, oil seepage etc. take their place in this respect and that they should be killed off in bird sanctuaries if the species useful to man are to increase at a maximum rate.

The editor replies in another paper taking exactly the opposite view i. e. that a bird sanctuary is for the benefit of all birds occurring naturally in it, and that an abnormal increase in "useful" species is not the object sought. While we agree with the latter view we must admit that a sanctuary may become the shelter of certain very destructive animals which will be far more destructive than under natural conditions and which may therefore have to be kept in control, but no species should be exterminated.

Lloyd, Hoyes. The Birds of Ottawa, 1923. (Ibid and concluded in the January issue.)

Brown, W. J. Notes on the American Woodcock. (Canadian Field-Naturalist, December, 1923.)

Snyder, L. L. On the Crown Markings of Juvenile Hairy and Downy Woodpeckers. (Ibid.)—Virtually confirms Ridgway's statement that young males have more or less red spotting on the crown and the females white spotting. Mr. Snyder's three "contradictory" specimens are in all probability wrongly sexed.

Henderson, A. D. Nesting Habits of the American Goshawk.

Preece, W. H. A. The Concentration of Migratory Birds at Sault Ste. Marie, Ontario in the Spring. (Ibid. January, 1924.)

Tate, R. C. Some Birds of the Oklahoma Panhandle. (Univ. of Oklahoma Bulletin, No. 271, Oct., 1923.)—An annotated list.

Littlejohns, R. T. Bird Personalities of the Australian Bush. Natural

History, January-February, 1924.)—A beautifully illustrated article with photographs of the Lyre-bird, Laughing Jackass, Wood Swallow etc.

Bailey, Alfred M. The haunts of the Emperor Goose. (Ibid. March-April, 1923.)

Peterson, Alvin M. Facts about Hawks You ought to Know. (Our Dumb Animals, February, 1924.)

Riley, J. H. Description of a New *Pycnonotus* from China. (Proc. Biol. Soc. Washington, Vol. 36, p. 193. December 19, 1923). *P. hoyi* (p. 193) Hunan Province.

Lincoln, F. C. A Note on the Food Habits of the Sharp-tailed Grouse (Ibid. p. 200.)

Oberholser, H. C. *Chloronerpes* Swainson versus *Piculus*. (Ibid. p. 201.)—Shows that *Piculus* must be used as the generic name for this group of Woodpeckers.

Carter, C. E. Denizens of the Australian Bush. (American Forests and Forest Life, March, 1924.)—With photographs of Lyre-bird and other species.

Watson, D. M. S.; Watson, K.; Pearson, H. S., and Karn, M. N. On the Nest and Eggs of the Common Tern, A Third Cooperative Study (Biometrika, XV, pt. III, pp. 294-345.

Chasen, F. N. A Rare Petrel (*Oceanodroma manorhis*) at Singapore Isl. (Jour. Malay Branch Royal Asiatic Society I, p. 255. April, 1923.)

Chasen, F. N. The Heel Pad in Certain Malaysian Birds. (Ibid. p. 237)—Present in some Capitoindae and in Woodpeckers and incipient in Eurylaemidae, Caprimulgidae, Cypselidae, Ploceidae, Nectariniidae, Corvidae and Bubonidae.

Oberholser, H. C. Descriptions of New East Indian Nectariniidae. (Jour. Wash. Acad. Sci., XIII, No. 11, pp. 226-232.)—Fourteen new forms of *Arachnothera Anthreptes*, *Chalcostithia*, *Cinnyris*, *Aethopyga*.

Jordans, Adalf von. On the Racial Groups of *Sturnus vulgaris*. (Archiv. für Naturgeschichte LXXXIX 1923, A. 3. pp. 1-147).—A lengthy discussion of the relationship of the 17 races from various points of view. [In German.]

Berlioz, J. Study of a Collection of Birds Obtained by the DuBourg de Bozas Expedition in Tropical Africa (1902-03). (Bull. Mus. Nat. Hist. Natur. 1922. No. 5 and No. 6.) [In French.]

Olsen, Oerjan. Ornithological Materials obtained by the Norwegian Siberian Expedition, 1914. (Fronso Mus. Arshefter. 44, pp. 3-61.)—Forty-six species listed. [In Norwegian.]

Robinson, H. C. and Kloss, C. Boden. Eleven New Oriental Birds (Jour. Fed. Malay States, Mus., XI. pt. 1, pp. 53-57.)

Lotsy, J. P., and Kniper, K. A Preliminary Statement of the Results of Mr. Houwink's Experiments concerning the Origin of some Domestic Animals. II. The Origin of Domestic Poultry (cont.) (Genetics V, 1, pp. 1-50.)

Wood, Norman A. Observations on the Birds of Berrien County, Michigan (Occus. Papers. Mus. of Zool., Univ. of Mich., No. 119, pp. 1-35.)

Myers, J. G. The Present Position of the Endemic Birds of New Zealand, (N. Z. Jour. of Sci. and Tech., VI, pp. 65-99.)

Schouteden, H. Note on the discovery of the Nest of *Pseudochelidon eurystomina* Hartl. (Rev. Zool. Afr. X. fusc. 3, pp. 323-328). [In French.]

CORRESPONDENCE

The Naming of 'The Auk.'

Berkeley, California, Feb. 15, 1924.

Editor of 'The Auk:'

Inasmuch as forty years have passed since the founding of 'The Auk,' a journal whose eventful and useful career every American ornithologist regards with proud satisfaction, one may recall the mild family tempest that raged over the choice of its name. It has been said that several of those who stood about the baptismal font would have sponsored very willingly quite a different title. For this reason the following skit, that appeared in the 'Boston Transcript,' January 23, 1884, and copied from one of the late J. A. Allen's scrap-books, now in the writer's possession, may prove interesting to those who have not read it.

CASEY A. WOOD.

"A SONNET.

(Respectfully dedicated to the American Ornithologists' Union, by one of the Associate members, and *not* by John Milton.)

A book came out of late ycleped the Auk;
Well printed was it all, and nobly writ;
On which some wights did spend their wit—
Some callow wights, I ween, who love to talk,
Yet scarcely knew a handsaw from a hawk
Unless the wind be right. They reckoned it
An ugly name, most hideous and unfit,
And some unsavory puns they did uncork.
Mayhap the title should have been The Hen,
Or else The Duck—both birds of mighty use;
But most, I think, it would have pleased these men—
Who pour upon The Auk such foul abuse—
If after *them* it had been called; and then,
Why then, 'tis plain, the name had been—The Goose."

Sexual variation in *Nephoecetes niger*.

Editor of 'The Auk:'

On page 69 of the January number of 'The Auk,' Mr. Ludlow Griscom denies the fact that the sexes of the Black Swift are similar in the adult, following Mr. Ridgway in this statement, (Bulletin 50, Part V), and expressly contradicting Hartert's description in the British Museum 'Catalogue of Birds', XVI, where the adults are said to be similar.

I have already (Auk, Vol. XXXIV, p. 41) pointed out that adults, (old adults?), are exactly similar in some cases, both as to the lack of light edging to the under parts, and the amount of emargination of the tail.

This is based on the collecting of about two hundred individuals of the northern subspecies, (*Nephoecetes niger borealis*), principally at the commencement of the breeding season when there could be no mistake in the sexing. The majority of females have the tail rounded and the feathers of the lower breast and abdomen broadly edged with white, but a good number present in a varying degree the characters of the male, some are absolutely indistinguishable in every way from fully adult males by external characters.

I have sent numbers of these during the past thirty-seven years to different collections, pointing out this character, and have a letter from the late Wm. Brewster commenting on it.

ALLAN BROOKS.

Okanagan Landing, B. C.

January 19, 1924.

Editor of 'The Auk:'

In 'The Auk' for January, 1924 (Vol. XLI, pp. 68-71) there is "A Review of the West Indian Black Swifts" by Ludlow Griscom. In his comments upon sexual variation in this species Mr. Griscom makes certain statements with which I take issue. I have no personal knowledge of the West Indian subspecies of *Nephoecetes niger*, but the statements to which I object are made as generalizations covering the species as a whole, and they assuredly do not apply to the race with which I am familiar, the North American subspecies, *Nephoecetes niger borealis*.

Mr. Griscom describes certain variations of color and markings as distinguishing males and females, and remarks of such supposed sexual variation that "this has already been correctly described by Mr. Ridgway" (Birds of North and Middle America, part V, 1911, pp. 703-710). He says further that "Hartert (Catalogue of Birds, Brit. Mus., XVI, 1892, p. 94 [*sic*; correctly, 494]) errs in regarding the adults as similar, and the birds with light tips to the feathers below as immature." This last assertion of error is altogether too positive and sweeping a statement of what is really no more than Mr. Griscom's opinion. My own conviction is that Hartert is correct.

There is an article on this subject by Frank M. Drew (Bull. Nutt. Orn.

Club, VII, 1882, pp. 182-183), cited at some length by Ridgway (*loc. cit.*, p. 707, footnote) and so, of course, familiar to Mr. Griscom, though ignored by him. This need not be dwelt upon further here, but I do wish to point out that there have also been published papers of my own ('Auk,' Vol. XXIX, 1912, pp. 241-242; Univ. Calif. Publ. Zool., Vol. XXIV, 1922, pp. 222-223), giving facts that are in contradiction to Mr. Griscom's opinions on sexual variation in this species.

Of the series of Black Swifts in this Museum I have myself shot and dissected twenty-eight specimens. Briefly, my assertion is that I have collected females of the Black Swift (*Nephoecetes niger borealis*) which in color and in lack of white markings ventrally are indistinguishable from adult males. I have talked on this subject with Major Allan Brooks, who has collected many more specimens of this Swift than I have, and he had long been familiar with the fact that some females lack any white-tipped feathers on the lower parts.

It seems then that three men who have themselves shot and dissected a number of these Swifts (and there are not many who are familiar with the species) are agreed that the (presumably fully mature) female is indistinguishable from the adult male. Surely this is evidence sufficient to establish this statement as a fact.

HARRY S. SWARTH.

University of California,
Museum of Vertebrate Zoology.
February 13, 1924.

NOTES AND NEWS

COUNT ADELARDO TOMMASO SALVADORI PALEOTTI, the last of the original Honorary Fellows of the A. O. U., died in Turin, Italy, on October 9, 1923, in the 89th year of his age. He was born at Porto S. Giorgio in Umbria, Italy, on September 30, 1835, son of Count Luigi Salvadori and Ethel Welby of England.

His ornithological studies were begun early in life, and in 1862 he published a Catalogue of the 'Birds of Sardinia' in the Proceedings of the Society of Natural Science of Milan. In 1863 he settled in Turin and from then on devoted his life to ornithology. He became Assistant in the Museum of Zoology, at the University, and in 1879 Vice Director, which post he held until the time of his death, developing the ornithological collection until it became the richest in Italy. His interest early centered on the birds of the East Indian Archipelago and he studied the many collections from this region received at the Civic Museum at Genoa.

In 1877 he travelled in Europe studying the collections of East Indian birds at Paris, London, Leyden and Berlin and in 1880 appeared the first

part of his '*Ornithologia delle Papuasie e della Molucche*' a classic work and probably his greatest production.

The years 1890 and 1891 he spent at the British Museum at the instigation of Dr. Bowdler Sharpe and prepared three volumes of the '*Catalogue of Birds*,' those treating of the Parrots, the Pigeons, and the Ducks, Tinamous and Ratitae.

He was the author of some 300 ornithological papers, a list of which appeared in 1900 and 1913.

In early life Salvadori studied medicine at Rome and Pisa and in 1860 took part in Garibaldi's second expedition to Sicily becoming the medical officer of his battalion.

His charming and genial manner have been matters of comment wherever he went and his work has been characterized as "scrupulously accurate." He received many honors during his long life and was the "oldest and most respected Honorary Member" of the B. O. U. which has published his portrait and a biographical sketch in the January '*Ibis*' to which we are largely indebted for the facts upon which the present notice is based.—W. S.

W. H. DUDLEY LESOUF, a Corresponding Fellow of the Union, died at his residence, Zoological Garden, Melbourne, Australia, on September 6, 1923, in the 67th year of his age.

He was one of the founders of the Royal Australasian Ornithologists' Union and the success of that organization was largely due to his energy and tactfulness during the critical period of its early history. For two long terms he served as Secretary and for two years was President of the Society.

LeSouef was born at Elwood, Victoria, and was educated at the Crediton Grammar School in England. At an early age he became assistant director of the Melbourne Zoo of which his father, Albert LeSouef, was then director, and upon his death succeeded him. Two of his brothers became directors of the Zoological Gardens at Perth and Sydney respectively.

Dudley LeSouef was one of the best informed men on the fauna of Australia, having made a life study of the birds and mammals and travelled widely over the continent. He was said to be able to distinguish the notes of practically all of the birds of the Australian bush. He was a born collector, a successful lecturer and a writer of ability, being author of '*Wild Life in Australia*' and with A. H. Lucas of '*The Animals of Australia*' and '*The Birds of Australia*.' He travelled widely in other countries to attend scientific meetings and to obtain animals for the Melbourne Gardens and will be remembered by those who attended the International Zoological Congress at Boston after which the writer had the pleasure of showing him the Gould Collection of Australian birds in the Philadelphia Academy.

He was full of cheery optimism and of a delightful disposition, a man who will be a distinct loss to science and one whom Australian Zoologists will always hold in affectionate remembrance.—W. S.

CHARLES FRANCIS JENNEY, an Associate of the Union since 1905, died in Boston on November 29, 1923. Judge Jenney was born on Middleboro, Mass., September 16, 1860. He was educated in the public schools of Middleboro and Brockton, Mass., and graduated from Boston University Law School in 1883, *summa cum laude*. He was admitted to the bar in 1882 and commenced the practice of law in Boston where he built up an enviable reputation.

In 1886 he married Mary E. Bruce and settled in Hyde Park, Mass., where the greater part of his life was spent. From 1886 to 1887 he served as representative in the Massachusetts Legislature and from 1907 to 1908 he represented the first Norfolk District in the State Senate. He also acted as town counsel for Hyde Park before its annexation to Boston, and was for over twenty years a lecturer on Massachusetts Practice at the Boston University Law School.

In 1909 he was appointed a judge of the Superior Court of Massachusetts and ten years later was elevated to the Supreme Court.

He was a keen and discriminating observer whose love of birds was genuine and of long standing. What little time he could spare from his many duties was devoted to trips afield, never alone, however, for Judge Jenney was of an extremely social disposition and loved to have others share his enjoyment of meeting with some of the rarer or more beautiful species of birds.

It was his custom to spend at least a part of his vacation each year in visiting regions of special ornithological or historical interest, and on such occasions he was invariably accompanied by his wife and both daughters. Among the places he thus visited may be mentioned, Percé Rock, Magdalen Ids.; Cape Breton Id.; Southern Labrador; Dismal Swamp, Virginia; Grand Cañon, Arizona; Bermuda; Shetland Islands and Hebrides.

He was a great lover of books and had built up a splendid ornithological library containing many rarities; his collection of Massachusetts local lists is particularly fine. The writer can recall no happier hours than some of those spent with Judge Jenney in his library, examining the beautifully bound volumes and listening to the history of this or that book.

In spite of his many honors he was of a very modest nature, and this modesty no doubt kept him from publishing his observations, since his ornithological bibliography is extremely brief.

In addition to his membership in many legal clubs and Historical Societies, he was a director of the Massachusetts Audubon Society, a member of the Nuttall Ornithological Club, serving as a member of its Council from 1919 until his death; the Boston Society of Natural History, American Academy of Arts and Sciences, Cooper Ornithological Club,

Wilson Ornithological Club, New England Botanical Club and the American Fern Society.

By reason of his many sterling qualities Judge Jenney had drawn to himself a wide circle of friends who both loved and respected him and who feel his passing deeply.—J. L. P.

NAPOLÉON ALEXANDER COMEAU, an Associate of the American Ornithologists' Union from 1885 to 1909 and from 1922 to the close of his life, died at Godbout, Province of Quebec, in 1923. He was born in 1848 at one of the Hudson's Bay Company's Posts at the Jeremie Islands. When he was nine years old, his family moved to the H. B. C. Post at Mingan in the Canadian Labrador, and here he hunted and fished to his heart's content, leading a care-free life until the age of eleven years when he was sent for a brief time to an English school at Three Rivers. In 1860, while still a lad, he was appointed Guardian of the Salmon Fishing at Godbout on the north shore of the Gulf of St. Lawrence near Pointe des Monts. This post he held until his death. He was also agent for the Hudson Bay Company, postmaster, telegrapher, deputy coroner and Dominion Government Fishery overseer. In addition to all this, he was for many years the faithful and expert physician of that part of the coast, a work of necessity that he assumed after a hospital course of only a month and a studious reading of medical books. He was largely a self-taught man and was always learning, especially from the great book of Nature.

It would be impossible in the space allotted here to more than sketch lightly the interesting and adventurous life of this man. He himself has told it very modestly and very charmingly in his 'Life and Sport on the North Shore of the Lower St. Lawrence and Gulf,' published in Quebec in 1909. The book is full of interesting and valuable observations on the life of the trapper and the Indian, and on the fauna of the coast, particularly on the water-fowl, ptarmigan and salmon, and it contains an annotated list of the birds. After much urging, Mr. Comeau included in this work an account of an adventure of his brother and himself in saving the lives of two men caught in the ice. In a canoe, the Comeaus made their way through forty miles of drifting ice in below-zero weather, and, after two days and a night of constant exertion and peril, brought their men safely to shore on the Gaspé coast. It was a dramatic and heroic deed, and is most interestingly and modestly told.

Mr. Comeau was first brought to the attention of ornithologists in October, 1881, when Dr. C. Hart Merriam, who had visited him at Godbout that summer, reported in the 'Bulletin of the Nuttall Ornithological Club' the Yellow-headed Blackbird in Lower Canada on the basis of a specimen taken by Comeau at Godbout in 1878. Later, Dr. Merriam reported his own observations on the birds of Pointe des Monts with which he incorporated Comeau's notes, followed in after years by four addenda based on skins sent him by that observer. After this Comeau himself sent several notes to 'The Auk,' the last appearing in July, 1923.

Mr. Comeau rarely went far from his beloved Godbout but, in 1882, he was the companion of Baron de la Grange on a hunting trip in the mountains of Wyoming, and in this year also he attended a meeting of the A. O. U. in New York. In 1914, he visited the northern shore of the Labrador Peninsula on the Hudson Bay side and in 1922, upon the invitation of President Mercier, he attended the annual convention of the International Association of Game, Fish and Conservation Commissioners at Madison, Wisconsin, and read a paper on the Wild Life of the Canadian Labrador, with special reference to the birds of the coast.

Those who have been privileged to know this interesting man will long remember his kindly face and the charm of his personality.—C. W. T.